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GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

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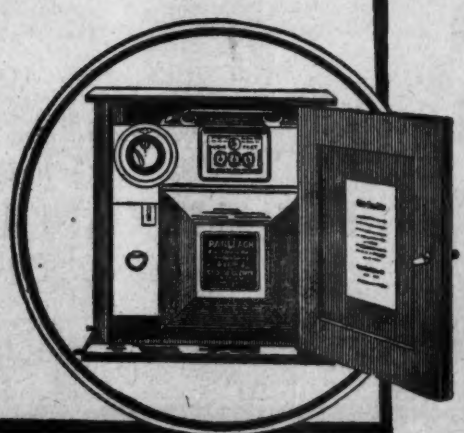

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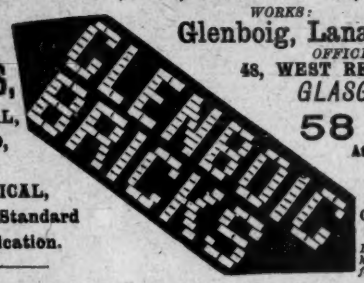

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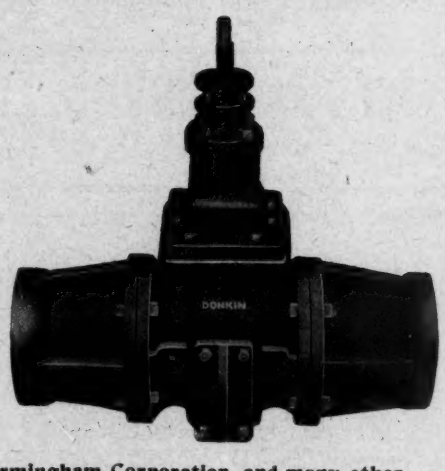

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EDITORIAL NOTES.

A Stable Government.

NON-POLITICAL though we are as an industrial journal, there must be an expression of satisfaction over the result of the General Election, in that it gives as good an assurance as we can have of freedom from the political turmoil and uncertainty that has for some years past overshadowed the people and the industries of the country. When the ballot-boxes yielded their ephemeral secrets, it was found that the major opinion of the country in all parts—industrial Lancashire being of the same mind as residential Surrey—was that its salvation was to be found not in the tenets and visionary projects of the Labour-Socialist Government, with planned roads leading to subversive exploits and revolutionary conditions, but in placing in power a stable Government who could give us a substantial period of peace in which to work individually and collectively for recuperation. The election has been a decisive victory; and in the circumstance of the experience of a Socialistic Government at the helm, the result has shown the political good sense of the country. There are some of our friends who would rather have seen a smaller majority and a nearer approach to a balance between the Government side and the composite opposition; but, on the whole, rather than the oscillations in the sphere of imperial government which have disturbed our affairs of late years, it is better to have certainty in order that there may be concentration on the revival of our industrial and trade activities and the improvement of our national interests. It was a good thing, when events took such a critical course as they did, that there was an appeal to the country. The policy of nationalizing mines, railways, and other industrial enterprises, and the miracles that national electricity generation was going to perform, have all been rejected by the country as fatuous notions; and they can now be packed away in the Socialist-Labour store and docketed so that future Labour-Socialists may see what were the nature of the singular and misconceived ideals that their predecessors had in mind—ideals without any fundamental justification or practicability. These things have been settled (let us hope) for years to come by the repudiation by the body-politic of the Socialist-Labour programme, so far as it was revealed; and now it will be the duty of the new Government to consider and do those things which will be of universal benefit for the established industries of the country, within the limits of the assurance of those to whom power has been entrusted. Through those established industries the country has progressed well; to them we have to look for the restoration of a standard of prosperity equal to (the hope may be expressed that it will with time be in excess of) anything experienced in the days before the convulsion and straining of the world by the great protracted war. It is noticed that among the friends of the gas industry who have seats in the new Parliament are Sir W. H. Cowan, Mr. Reginald G. Clarry, Mr. R. J. Neville, Sir Alfred Mond, and Mr. W. E. Pease; and representatives of the interests of the workers in the gas industry are the Rt. Hon. J. R. Clynes, Mr. Will Thorne, and Mr. Arthur Hayday. How many members there are who are concerned in the direction of, or as shareholders in, gas undertakings, we do not know; but there is no doubt that there is a very fair proportion.

The Closed Gates at Wembley.

THE gates of the great British Empire Exhibition at Wembley were closed to the public last Saturday. To-day the wide avenues and buildings through which many millions of people have wandered and have found vast interest and enlargement of knowledge are now deserted, save by attendants and workmen. We shall remember it all with much affection and pride, for it was a marvellous conception, and an equally wonderful demonstration of our Empire's resources and industrial and commercial power, as well as of organization and enterprise. Certain it is that it will have a conspicuous place in the history of the Empire, for it has established another strong bond for its several units.

It is regrettable that the weather during the past six months was not more favourable to this enormous creation. Nevertheless, something like 17½ millions of people have passed through its turnstiles. They have come from all parts of Great Britain and Ireland, and from all quarters of the globe—even from the Far East and West, and from Southern and Northern climes. It has been a strong magnet. The question has been asked, Has it been a success? To answer the question, What criterion should be taken? Number of visitors is not sufficient; a mere balance-sheet based on receipts and expenditure would be of no avail. The true consideration is the mission that the Exhibition was chiefly designed to serve, and that was to make known the industrial and commercial resources and potentialities of the British Empire, and our progress in the art and science of manufacture and production. The mission has been completely and faithfully fulfilled; and the way has been paved to larger patronage of our industries and products—raw and manufactured—in the future.

What is true of the Exhibition as a whole, is true of its many parts, including the Gas Exhibit, which has won so much praise, has attracted so many visitors, and has afforded means of impressing upon countless men and women the range of utility and services of the industry. This united effort of the industry—including suppliers of gas and makers of gas plant and appliances—comes to an end with the rest. We shall remember it all with pride; for it is the largest individual piece of propaganda work in which the industry has ever engaged, and success has marked its course from beginning to finish. With its close we must not forget the great indebtedness of all in the industry to those who took, with self-sacrifice and unremitting energy, the leading part in its organization and management—not omitting, too, the attendants. There are also those who financed the exhibit according to their place in the industry, and without whom there could have been no such display. The combined effort was the potent source of material effects; and the effects have been day by day developing, and will continue to develop if every gas undertaking in the country will assiduously follow up the work that was done there. At that one place seed was scattered among people from all over the country; the work of cultivation has now to be taken in hand.

The Prince of Wales last Saturday, at the valedictory gathering in the Stadium, paid a rich tribute to all concerned in the organization and conduct of the Exhibition in whole and part; he spoke of the fulfilment of the hope that His Majesty the King expressed at the opening, that the Exhibition would bring the people of the Empire to a better knowledge as to how to meet their reciprocal wants and aspirations; and he also hinted that the question of whether

or not the Exhibition will reopen its gates next year is still in the balance. If it does not, the stately display of 1924 will live long in the memories of all who visited it, and inspected its marvels.

Electric Cooking and the Leicester Report.

SOME of our electrical friends at the present time are vieing with each other in employing hyperbole in writing on the future of electric cooking, which, of course, according to prediction without a foundation, is going to be a glowing one. They are welcome to indulge in this pastime if they think proper with facts weighing so heavily against them, so long as their efforts do not deceive the public. The statements to which we refer appear in the electrical papers, which the general public do not see; but they are read by electric salesmen who come in contact with the public, and who utilize the postulation in their propaganda. These men are pleased to be able to say that Mr. So and So, who is an authority on these matters, has asserted that such and such is the case. One of those statements we especially desire to nail to the counter as spurious coin. Recently the writer of "Electric Supply Memoranda" has been dealing with some of the flights of imagination of these electrical gentlemen; and mention has been made of the letters of a prolific correspondent—Mr. L. L. Robinson, the Borough Electrical Engineer of Hackney. It is a remark that he made in a letter published in the "Electrical Review" which we assert was unjustified, misleading, and therefore mischievous in the effect it might have upon competing gas through its use by those electrical salesmen who look upon Hackney as a reliable source of information. Referring to tests of gas and electric cookers at Leicester, he said: "I have a kind of "idea that those tests were insisted upon by the Gas De- "partment of that city, but in the end it was thought best "not to publish them in case the result should be the "winding-up of the department."

That statement is untrue. It may not have been written maliciously; but the form of it, particularly the last part of it, is of a character upon which men who are above acting meanly and love fairplay will know how to pass judgment. In this they will be aided by recent publication. Mr. Robinson's letter was circulated in the "Review" on Oct. 10; and the answer to the quoted message has come speedily, from two directions. In the first place, instead of the prospect of the Leicester Gas Department being wound-up, we see that the large expansion of the gas business in the city demands considerable extensions of the manufacturing plant. That is one answer to Mr. Robinson's statement, and a second very direct one comes—not as a result of Mr. Robinson's letter, but in the ordinary course of municipal procedure—through the report of a Special Committee appointed by the Council to consider the whole question of the production and distribution of light, heat, and power by the Electricity and Gas Committees, especially "as to whether it is most economical to define, limit, or encourage competition between the two." The issue of the report and the statements in it negative entirely the assertion that "it was thought best not to publish them [the tests] in case the result should be the winding-up of the Gas Department." The report was published in our news columns last week; and it says: "Generally speaking, the Committee advocate gas for cooking and electricity for lighting in the house." Would the Committee have advocated gas for cooking and electricity for lighting if the results of the cooker tests were such that "it was thought best not to publish them in case the result should be the winding-up of the Gas Department?" It would be interesting to learn from Mr. Robinson his authority for making a statement which is now proved to have no foundation in fact.

There are a few observations we should like to make on the report. The Committee show that in Leicester the consumer of gas receives 12,500 B.Th.U. for a penny; the electricity consumer 3411 B.Th.U. (3420 B.Th.U. per KW.-H. is the usually accepted figure). But the Committee state that the higher efficiency of electrical apparatus considerably reduces this difference. The efficiency would have to be of a marvellous order to nullify to any material extent the difference of 266 p.ct. between the 3411 B.Th.U. and the 12,500 B.Th.U. It would be instructive to ascertain in what part of electrical apparatus such higher efficiency resides which reduces "considerably" the higher advantage gas has in the B.Th.U. supplied. It is not found on the hotplate of the electric cooker; and for room heating the higher efficiency—about 20 p.ct.—of the electric fire is deeply swamped by the difference in the heat units supplied for a given price. As to the hotplate, the Committee themselves say that "the top of the gas-stove is certainly more serviceable for the average housewife." No wonder, seeing that something like 80 p.ct. of the work of the cooker is done on the hotplate, and only about 20 p.ct. in the oven. The same proportions would apply to the electric cooker if employed in the range of service to which the gas cooker is applied. Of course, the secret—if it can be so called—of economical operation by gas is found in its cheapness as the heating agent, through the facts set out in the report under the heading of coal conservation. In dealing with smoke abatement, the report says: "Summarized "broadly, it may be said that gas is cheaper for all light, "heat, and power purposes, but electricity is cleaner and "more convenient. Electricity is certainly more flexible in "application." There are points in the quotation which invite comment. We suppose that the comparison as to cleanliness is based upon the purifying effect upon the atmosphere of the heat and mechanical action of the gas flame. If so, then from the sanitary point of view it is really an advantage; but if the matter has not been so regarded, then the Committee might have brought in, to compensate for the "cleanliness" of electricity, the lower intrinsic brilliancy of the incandescent gas mantle and the quality of the light as being less injurious to eyesight than the electric light. Another point we cannot understand is why electricity is supposed to be more convenient and more flexible than gas. Take, for instance, gas and electric cookers. With the gas tap one can regulate to any degree of heat desired; with the electric switches, one is confined to (say) full, half, or quarter heat—that is to say, the heats are fixed without the useful gradations between. The flexibility of gas is therefore distinctly greater than that of electricity. We remember Sir William Ramsay saying in 1912: "Dur- "ing the last few years I have been working with gases in "large and small quantities. This has brought me to the "conclusion that the easiest thing in the world to manage "is gas. . . . It will change from place to place just as "one choses, and by pressure at one end of a pipe, one can "make it stream at whatever rate and pressure one likes. "At the other end of the pipe, one can do what one wishes "with it. Coal gas is easily conveyed, and very easy to "work with."

The cooking tests referred to in the report, it seems, were carried out under the direct observation of the Committee; and a dinner for five persons was cooked by experts in each case at a cost of less than ½d. per person (the charge per therm of gas and per unit of electricity is not stated). While the oven of the electric cooker "appeared" to be the more efficient, the Committee state that the top of the gas oven was certainly more serviceable for the average housewife. Both the cooks effected economy by cooking slowly. Immediately the required heat was attained, the minimum of heat was used to complete the cooking. Again, heating water was cheaper by gas, particularly with large quantities. But much depends upon intelligent manipulation, "especially with electricity." This electricians have themselves acknowledged by their exacting instructions to users as to what they should do to save the dearly-purchased heat. The Committee further suggest that the Housing Committee should experiment with two houses—one all gas and the other all electricity. That would be a good test, providing an equal amount of work was done in both; otherwise the result would be of no value whatever.

Although there are a few points in the report which have called for a little comment, we are pleased with the manner in which the Committee, as independent observers, have dealt with the questions submitted to them. With their final pronouncement, too, we agree. They cannot see that limitation of either of the two services is practicable or desirable. If limitation were resolved upon, it would not last long.

Protection and Preparation.

REMINDER was given by Dr. Carpenter, in his address from the chair of the Gas Companies' Protection Association at the annual meeting last Thursday, that the organization has been in existence for twenty-seven years. Many of us can remember the inauguration of the Association; but we pass through the years, while health and strength continue, without much heed of the imperishable truth—*tempus fugit*—until some incident, such as this incidental remark, stirs memory.

The Association was really the first co-operative organization in the gas industry with definite objects, which had never previously been effectually looked after in the interests of the industry. But the records show the large place that the Association has had in the great and serious fights which have had such a marked influence upon the fortunes of the industry, and in which fights previous Chairmen and Dr. Carpenter have taken a distinguished leading part. During the past year, however, as the Chairman pointed out, there have been no outstanding questions which called for action, or problems which required solution. Such matters as have had to be dealt with were of the kind which one must expect to crop up any day in an industry with dimensions and ramifications such as those of gas manufacture and supply, with its accompanying important secondary business and interests. But though the year has had nothing of an exciting nature in it, there has been much useful work requiring attention and disposal by the Committee and the Secretary (Mr. F. E. Cooper), as related in the annual report of the Committee and expatiated upon by the Chairman. There is no desire on the part of the industry to have any year with a predominant feature calling for action by our offensive or defensive forces. We should like the most prominent feature of every year to be simply one of continued and enlarging progress in the service of the community; but such an ideal state, of course, cannot be with competing interests all about us, and authorities who seek unjustly to impose new obligations and responsibilities upon our industry. Careful reading of Dr. Carpenter's address and of remarks by the Vice-Chairman (Mr. R. W. Edwards) conveys the warning that in these days of prosperity there must be no relaxation of preparation for any and every happening; and therefore those organizations that have proved to be effective in the past must be maintained at the fullest possible strength to deal with anything that may befall in the future. We have had our bolts from the blue in the past; we shall have our surprises in the future. Things look fair and promising now; and it is just at these times, unless there is reflection and projection of thought, when the utility of something that has been advantageous in different circumstances may be questioned. Dr. Carpenter's words caution us against that; and, also looking forward, Mr. Edwards urges that these days of prosperity are the ones in which to develop means of production so that they will respond to requirement as economically as possible. These days are also the ones in which to develop work to ensure that what is produced economically is used by our customers as economically and efficiently as possible. The one line of operation is as important as the other; and both are essential. The difficulties of our chief competitors in cultivating business along new lines are only spurring them to greater activity in trying to discover fresh expedients to attract and to obtain custom. There are many gas undertakings with administrators whose eyes want opening to this, and who would greatly profit by the application of the electrical example in activity. Individual effort, as well as co-operative agency, is needed for complete protection.

Defects in Appliances and Methods.

To bring the gas industry up to the highest standards in every direction, the men of largest practical experience in each department of the operations of an undertaking should be brought into consultation. One is impressed with this by the variety of papers and expressions of opinion that have been obtained since members of the staffs subordinate to the chiefs have come upon the platforms of our new organizations. An instance is afforded this week by the Presidential Address of Mr. Harry Clark, who is in charge of the distribution and sales department at progressive Derby. No doubt Mr. Clark could have composed an address filled with the good things which the industry does; but he obviously believes in the good things being made better, if it be possible. His experience in work among consumers has been large and diverse; and he knows there are weak places in our methods and our productions. Therefore he has taken the opportunity afforded by his presidential office of pointing them out, but not as acutely as he might have done had he chosen to have been caustic, and put names to (for instance) some of the types of appliances which he censures. The address is therefore intended to be constructive; and if it has good effect, the end in view will have been attained.

One gets almost weary of emphasizing the fact that competition with the gas industry is growing keener and keener; and yet the truth is forced upon us that many concerns go on in the same indolent way, as though conditions had not changed, and are not still changing. For them, unless there is speedy revision of policy, a day of reckoning is not far off. One effect of competition to which all too little heed is paid is that those whose custom gas undertakings desire are taking greater interest in actual working costs and relative conveniences. That has to be met in two ways. In the first place, it is necessary that the men who come in contact with the consumers should be competent to give them full and reliable information and advice; and, in the second place, the appliances that are offered and fixed must themselves be capable of justifying the performances attributed to them. Regarding the first point, it is obvious, looking around and ahead, that the canvassers or salesmen will have to be educated to a higher standard than in the past. Their qualifications and knowledge must keep pace with the developments within the industry and with those outside which affect their work, and which may make it more difficult for them. Mr. Clark says it is impossible to exaggerate the value of really first-class canvassers, or, as he prefers to call them, "advice inspectors," who have had a technical training. The value of such men is instanced by the statement that the actual sales by one of them in Derby last year amounted to over £5000; and for the first six months of this year they represent upwards of £2500, which includes nearly 400 gas cookers, fires, geysers, and coppers. A qualified man such as this is commercially valuable, as he can reliably assist consumers to come to decisions; and, if his advice is justified in the result, he earns a degree of confidence among the patrons of gas which is a great asset to an undertaking.

But this brings us to the point as to appliances. The excellent work the manufacturers of gas appliances have accomplished in their improvement is recognized by Mr. Clark; but he finds that insufficient is being done by them. From a list of defects that have been found in well-known types, it is clear that there is not always the consistency in the details of production that is desirable. That charge we are certain Mr. Clark does not wish to be taken as having general application; but rather that just as there are weaknesses in the methods of gas undertakings in dealing with the vital sales side of their business, so here and there weaknesses exist in the structural details of certain of the appliances that are placed on the market by some manufacturers. This is an allegation born of experience; and it is not confined to those cheap, nasty, and inefficient goods which consumers purchase, have fixed, and use without the knowledge of gas undertakings whose administrators have not reached that standard of policy (urgently claimed by the times and trading conditions) which embraces periodical inspection. The manufacturers will ask themselves whether "the cap fits," and then make close survey of their goods to ascertain whether or not they could be arraigned by those having charge of the sales departments of gas undertakings. Before making survey, they should read the section of the address headed "Where the Industry is Weak." The charge which Mr. Clark made as to the defects in details was illustrated at the meeting by a display of actual faulty parts. Mention was made of the small bore of the connection of a gas cooker which has been fixed in large numbers in various places in the country, and this in many cases without any test being carried out under district conditions. From information which has from time to time reached us, we are inclined to the opinion that some of the makers of gas appliances have not yet grasped the demands that are made upon them by the operation of the Gas Regulation Act. The fact that in a district where (say) 400 B.Th.U. gas is distributed, the carrying capacity of connections, &c., must be of a more capacious order, if satisfaction is to be given, than where (say) a 560 B.Th.U. gas is supplied has not even yet impressed them sufficiently to cause the makers to provide for the differences in quality which demand differences in volume. The blame for this must be shared by the gas undertakings who purchase and fix such appliances without a test for adequacy. Unfortunately the testing is left to the consumer, and dissatisfaction and complaint result. It has been pointed out to us that water undertakings do not allow this sort of thing, and that all types of water fittings must be tested and stamped before use. The question has been asked, Why cannot gas undertakings do the same? Water undertakings are only permitted to do that by legislative authority; and similar authority would be

necessary in the case of gas undertakings, seeing they are under an obligation to supply with gas any applicant who comes within the very simple conditions statutorily laid down. There is, however, no authority to restrict the consumer to use only appliances which can pass a standard that a gas undertaking might prescribe. In our opinion, with the countless appliances in use to-day, periodical inspection would do much to effect the discharge of inefficient appliances from service, and set up in their places those that would be a credit to a gas undertaking. The criticisms and suggestions in the address do not, of course, apply universally to the industry or to the conditions prevailing in any one district. If that were the case, there would be only the remnant of a gas industry in existence instead of the highly prosperous one that actually exists, but which prosperity makes it the envy of competitors, and causes them to increase the intensity of their attacks. That is a reason, to add to the honour that comes from good service, why the weak places in our methods and appliances should be made strong.

Another fragile place is present in the old cookers that are in service in some gas supply districts, and which are through inefficiency daily adding unnecessary consumption to the consumers' accounts. The standard of efficiency to which modern cookers have reached condemns these old ones; and no self-respecting gas undertaking should allow them to continue in service a day longer than is unavoidable. Some undertakings have entered upon the systematic modernization of their cookers; and this Mr. Clark advocates should be done in all cases. Let it be remembered that gas cookers produce an all-the-year-round custom; and that is why the electrical people are coveting the business, and are striving hard to get it. In this, inefficient gas-cookers will assist them. In connection, too, with the power load, Mr. Clark is of opinion that the gas industry is slow. The volume of gas-engine business through a single service is something worth preserving, and something for which special terms should be arranged. He is also in favour of hiring-out engines, and of schemes of hire-purchase for them. With him many may disagree; but before doing so, it will be as well to read the case he presents in this connection towards the end of the address. In his view, scores of customers for motive power have been lost by the gas industry through the want of enterprise in this direction; and who can say that he is not right?

We welcome the address as a piece of constructive criticism designed to eradicate the weak places still remaining in a system which in other respects has made large strides to higher standards. If intention is successful in even partially helping to the desired end, the effort will not have been in vain. Anyway it cannot be denied that facts justify the impeachment contained in the address.

The City Beautiful.

A NUMBER of influential and distinguished citizens of Newcastle-upon-Tyne have formed themselves into a Society having for its aims the improvement of the beauty, the health, and the amenities of the city. The aspirations and objectives of the new body will appeal very strongly to the gas industry; and it could wish that every urban area in the country had an organization having similar ambitions and intentions. There is a precedent in the Cockburn Society in Edinburgh, and comparison of Newcastle with Edinburgh is enough to make the people of the north-east coast city envious. It is a good thing when abounding ugliness, squalor, and grime cause people to wish for something better, and induce them to get together to see if anything can be done. The new Society is destined to be a sort of pivot which will cause movement in a number of other influential organizations; and even the City Council—there is the assurance of the Lord Mayor of this—will welcome its collaboration. This is all very promising. One of the principal movers in the formation of the Society has been Sir Theodore Morison, Principal of Armstrong College, who by voice and pen has been eloquent as to the work to be done and the means of doing it.

One of the lines of operation is to work for the conversion of the air of the city from a state of impurity to one of purity, for the promotion of health, cleanliness, and the saving of money and labour which are wasted through the effects of a smoke-laden atmosphere. Sir Theodore impales one of our curious methods of doing things when he points out that the City Council spend a great deal of money on the medical care of children, and do valuable work, much of which, however, is immediately undone by impure air and unhygienic homes. His opinion is that no real advance in town improvement can be achieved unless the problem of smoke abatement is tackled. "You cannot make the town "beautiful, you cannot make it healthy, unless you reduce "the smoke which vitiates the air. . . . Collectively "we should be much richer if the air were not polluted; "there would be less painting, cleaning, and washing in "every household; we should all gain in health. The pol-"lution of the air by smoke can be prevented." With more men with the vision of Sir Theodore Morison about the country, we should make headway in this matter of first national importance at a rate faster than obtains at present—particularly if aided by permissive legislation which would enable local authorities to make by-laws dealing with the matter, as contemplated in the amended Smoke Abatement Bill which was before the last Parliament. In a letter to the Newcastle papers wishing well to the new Society, Dr. J. T. Dunn—well known to the gas industry—points out that if every householder would do what he easily could to reduce his individual smoke, a marvellous change would be wrought in the conditions of our towns. He presented well the claims of gas fires and ranges and coke stoves for domestic operations. He is very favourable to the screened coke available to-day for domestic purposes—the screening giving the coke a value which it did not possess in times past when deliveries consisted of mixtures of large coke, breeze, and a considerable proportion of dust. Even if coke is not used alone, but in admixture with coal, there would be an appreciable reduction of the smoke nuisance.

However, the Society has been formed. The work to which the members will now address themselves is to suggest and bring together schemes for the improvement of the city (including one as to smoke abatement), consider them, submit them to the City Council, and make them publicly known. We wish the Society great success, and hope for widespread emulation of their local efforts.

Councillor Gas Directors.

The Chertsey District Council appear to be playing a game of battledore; and Mr. G. R. Wells is the shuttlecock. When the late Mr. Justice Bailhache delivered his judgment which so much disturbed the souls of those voluntarily engaged in the work of local government, the pious and law-abiding Council of Chertsey thought it right at once to dismiss Mr. Wells from office as a councillor; he being also a Director of the local Gas Company, with whom the Council have a contract. They could not wait for a decision on the subject. Mr. Wells must go, and so he went. Now the Court of Appeal has reversed the judgment in the circumstances of Mr. Alderman Braithwaite being a salaried official—that is to say, a salaried Managing Director—of a Company with whom the Leeds Corporation have a contract. The Chertsey Council have therefore passed a resolution rescinding their former one, and so Mr. Wells is at liberty to return to the work of assisting in local government. They have made themselves look rather ridiculous by their desire promptly to comply with the rulings of the Courts. However, the later action of the Council shows a confidence that the judgment of the Court of Appeal applies to the case of a councillor who is a director of a gas company with a contract running with a local authority. The majority judgment of the Court of Appeal expressly states that it only applies to cases which come within the exact scope of the Braithwaite one. The point of the decision was that as Alderman Braithwaite was paid a fixed salary as Managing Director, he had no interest in the contracts with the City Council other than as a shareholder. So long as this is not reversed by the House of Lords, then all similarly circumstanced councillors are safe. If we were asked to express an opinion, for what it is worth we should say that a gas company director, with a fee fixed by the shareholders, and having no further financial interest in contracts with the local authority than as a shareholder of the contracting company, would be as safe as Alderman Braithwaite—unless the judgment is reversed by the House of Lords. A legal authority writing on the subject, however, expresses the opinion that it would be dangerous for a Managing Director, having a seat on a local authority with a contract running with his company, to receive a rise in salary during the duration of the contract. That seems to be unduly stretching the matter; but, if true, then it would apply to the fees of an ordinary director during the duration of a contract.

Combined Gas and Electricity Supplies.

In the development of its generating work, the electricity supply industry has proceeded along a single track; and it has been too busy endeavouring to make progress along it to ascertain whether or not there are economies for it elsewhere. Time was when some of its armchair experts used to ridicule the idea that any relationship with the gas industry could be established which would mean any economy or efficiency for it. Now gas coke is used with economic advantage in generating stations; the Electricity Commissioners show that the highest efficiency that can be claimed by any station is found in an internal combustion engine equipment; and it has been suggested by Mr. A. Hugh Seabrook—one of the most progressive of fuel economists among electrical engineers—that gas-works might be constituted tributaries of electrical energy to a main distribution system. It seems very probable that the combinations which are being made of gas and electricity supplies will yield some important lessons for the electricity supply industry; just as there is also good probability that it will be found by manufacturers that the dream of cheaper current from super-power concentrations is all a myth, through any advantage being derived from them being swallowed up in the additional distribution expenses and losses. The position is daily growing more and more interesting—particularly in view of the advocacy of coal conservation through the co-ordination of its use. Perhaps the new Government will take a broader view of potentialities in this regard than their predecessors in office, or, equally visionary, the followers of Mr. Lloyd George, who, however good a politician he may be, has very crude notions as to the technical problems and possibilities of this matter. He believes that he has fathomed the secret of producing cheaper electricity—the path he has discovered being simply the old one which others have recommended long before him, without taking into account other obvious means of realizing what is desired, and at the same time serving the nation's future by making the most of its coal supplies in the present. Coal being our greatest asset, the question of its most profitable use should have precedence in all consideration of the problem of the production of heat and power. Bearing upon these questions are some extracts in other columns from a contribution made by Mr. Seabrook to the "Fuel Economy Review" of the Federation of British Industries.

Raw Materials for Sulphuric Acid.

In a communication to the National Gas Council, the National Sulphuric Acid Association, Ltd., state that in the year 1923-4 the following quantities of raw material were used in the manufacture of sulphuric acid: Pyrites, 350,000 tons; spent oxide, 148,000 tons; sulphur, 66,000 tons. The Association point out that the consumption of spent oxide now remains at a very high figure; and it is considered that there cannot be any stocks of spent oxide accumulating at gas-works.

The Municipal Elections.

Following closely upon the General Election, there came the municipal ones in over 300 cities and boroughs in England and Wales. A feature of the returns is the large proportion of Labour candidates who were defeated. In about eighty of the principal cities and towns that party put forward 645 candidates; just over fifty were unopposed, and at the poll 154 were elected, leaving 437 unsuccessful. Of the 524 candidates nominated by the Conservatives, 127 were returned unopposed. At the poll 290 were elected, and 107 were rejected. The Liberals had 69 candidates returned unopposed out of a total of 285. A further 125 Liberals were elected at the poll, and 91 defeated. Out of 222 candidates, the Independents had 128 elected, including 50 unopposed. Just over 90 were defeated.

Membership of Trade Unions.

The returns collected by the Chief Registrar of Friendly Societies and the Ministry of Labour show a net reduction of some 200,000 in the membership of trade unions during 1923. At the end of the year the total number of unions was 1135, as compared with 1176 in December, 1922—the reduction being due partly to dissolutions and partly to amalgamations. The total membership at the end of 1923 was approximately 5,405,000, as compared with 5,610,000 at the end of 1922—showing a decrease of 205,000, or 3·7 p.ct. Nearly all the main groups of unions sustained reductions in membership last year; the principal exceptions being the mining and quarrying group, in which there was an increase of 70,000 (over 8 p.ct.), and the railway group, which showed an increase of 35,000 (nearly 8 p.ct.). The greatest reductions were in the metal, engineering, and shipbuilding group, in which the membership fell by 133,000, or about 16 p.ct.

PERSONAL.

Last week's sweeping changes at the polls, which have resulted in the placing of the Conservatives in a position of great preponderance over all other parties, have not been responsible for a proportionate alteration in parliamentary representatives who are in any way connected with the gas industry. Sir WILLIAM ALEXANDER (the Chairman of the British Dyestuffs Corporation, Ltd.), returns to Parliament for Central Glasgow; and Mr. REGINALD G. CLARRY has again been elected for Newport (Mon.), with a largely increased majority. Sir HENRY COWAN (Chairman of Messrs. Parkinson and W. & B. Cowan, Ltd.) still represents North Islington. Sir ALFRED MOND has been elected for Carmarthen. Mr. R. J. NEVILLE returns to Parliament to represent Eastern Norfolk; and Mr. W. E. PEASE (of the Consett Iron Company) for Darlington. Sir JAMES REMNANT, Bart. (a Director of the Welsbach Light Company, Ltd., and of the Continental Union Gas Company, Ltd.), has largely increased his majority in Holborn. Among the successful Labour candidates are Messrs. J. R. CLYNES, A. HAYDAY, ROBERT SMILLIE, and WILL THORNE.

Mr. S. SHADBOLT, the Engineer and Manager of the Southbank and Normanby Gas Company, Ltd., and President of the North of England Gas Managers' Association, has undergone an operation for appendicitis. His many friends will be pleased to learn that he is progressing favourably.

Mr. E. HAZZARD HARMAN, who is well known to many readers of the "JOURNAL," has joined Messrs. R. Dunning & Co., gas and steam coal contractors, of No. 16, Eastcheap, E.C. His extended experience of all phases of the gas industry will prove of great assistance to him in his new undertaking, which we trust will prove in every way successful.

The marriage recently took place at Douglas, Isle of Man, of Mr. J. CORRIGAN, Assistant Gas Manager to the Penrith Urban District Council, and Miss S. Kennedy, of Douglas.

OBITUARY.

The death is announced of Alderman C. F. THOMPSON, a former Mayor of Dudley. He was the Chairman of the Dudley Gas Light Company.

The death has occurred of Mr. JOHN MURPHY, for many years a Director, and for about ten years Chairman, of the Alliance and Dublin Consumers' Gas Company. He succeeded the late Alderman W. Cotton, M.P., in the latter office, and on his retirement last March owing to advancing years was in turn succeeded by Mr. Francis J. Dickens, of Manchester. Mr. Murphy, who had reached his 84th year, brought remarkable ability and judgment to the control of the Company's affairs; and especially during the war period and years of political trouble in Ireland, his tact and zeal proved invaluable. His gifts as a financier secured him the Chairmanship of the Hibernian Bank, which he filled for several years with high distinction. Of genial temperament, he was popular with the officials and staffs of both the Gas Company and the Hibernian Bank, who deeply lament his passing. His son, Mr. Joseph X. Murphy, a Governor of the Bank of Ireland, is his successor in the directorate of both Companies. Deceased was a member of the shipowning firm of Palgrave, Murphy & Co., Dublin, and a brother of Sir Michael Murphy and the late Sir James Murphy. Like his brothers, he was some years ago offered a baronetcy, but declined the honour. A generous benefactor of various Dublin charities, he was a Governor of the Royal Hospital for Incurables, Donnybrook.

Statutory Gas Companies (Electric Supply) Powers Bill.—At the meeting of the Gas Companies' Protection Association (reported in later columns) allusion was made to this Bill, which, owing to the course of political events, has been temporarily hung up. In the report of the Parliamentary Committee of the London County Council, reference is made to the matter, though seeing that the Bill is not likely in any way to affect electricity supply in the jurisdiction area of the Council, it is difficult to see why they should interfere. But they have done so. The Committee state that the main objection to the Bill appears to be that its operation would remove the stimulus of competition, and they accordingly approached the Electricity Commissioners. The Commissioners intimated that they had no objection to the Bill, but would ask for an amendment to require a gas company obtaining powers to supply electricity to keep separate accounts of the two undertakings, and that in any Electricity Order granted under the Bill a penalty clause in case of non-compliance with the provisions of the Order and a cesser of powers would be incorporated.

CLOSING SCENES AT WEMBLEY.

The Final Phase of the 1924 Exhibition.

On Saturday last the Prince of Wales, as President, brought the season of the British Empire Exhibition to a close. The closing ceremony was marred by a heavy downpour of rain, but, despite this, it was of a most impressive character; and the many thousands who, drenched by rain yet cheerful and determined to lend support, witnessed the finale constituted another proof of the fundamental characteristic of the British—to stand together in spite of difficulties. Saturday's ceremony was a further expression of the solidarity of the British Empire.

THE PRINCE'S SPEECH.

The Exhibition opened in a blaze of glory; simplicity was the keynote of its close. At four o'clock a roar of applause went up from the crowd of 80,000 as the Prince appeared. After reviewing the guard of honour, supplied by the Welsh Guards, the Prince made his speech, which was heard clearly throughout the Stadium. "The British Empire Exhibition," said the Prince, "has achieved a full measure of success in the task which it set out to accomplish. The splendid pictures which the self-governing Dominions, India, the Crown Colonies, the Protectorates, and Mandated Territories have given of their social life and of their capacities for production have shown to the people of our Home Country very clearly how great are the resources and how boundless are the potentialities of our territories. For the first time they have had the means of coming to a real knowledge of the Empire which has sprung from these Islands. There are many gratifying indications of the direct benefits that will come from this knowledge, by a greater demand for the products of the Empire, and by a better appreciation of the opportunities offering for successful careers in the Empire overseas. Some eighteen million people have passed through the turnstiles of the Exhibition, and of these five million were children, who have gained from it a vivid impression of the responsibilities which will come to them in the future as citizens of the Empire." The Prince concluded by saying that negotiations with a view to considering the reopening of the Exhibition were now taking place.

A few simple prayers spoken by the Bishop of Willesden were followed by the singing of "O God our help in ages past;" and as the words died away bugles sounded "The Retreat."

THE SUCCESS OF THE GAS EXHIBIT.

It is an ill wind that blows nobody any good; and no better day than last Saturday could have been chosen for bringing home to the public the real meaning of "gas comfort." The people literally flocked to the Gas Exhibit, finding solace in its radiant warmth and cheerful light from the cold and clinging mist which enveloped the Exhibition grounds. Throughout the run of the Exhibition the public have not merely been impressed by the intrinsic merits of gas as an illuminant and a domestic and industrial fuel, but have discovered that there is a very real desire on the part of the gas industry to give a more than satisfactory service. They have learned that the ideals of a public utility undertaking are not mere vapourings, but have found expression in practical form; and all in the gas industry would have felt gratified and inspired by the favourable comments which were everywhere heard. The outstanding success of the Gas Exhibit has been due in no small measure to the excellent way in which the staff have given of their best in their relations with the visitors to the Exhibit. A genial atmosphere has always prevailed; and the fruits of this service, already in evidence, will be greater than anyone could have been led to hope at the commencement of the Exhibition. From the Exhibit the public have gained a knowledge of gas which will result in direct benefit to themselves and to the industry, and a greater demand for a product which ensures health and comfort. There is just one thing we would add to this. People have been led by the Exhibit to expect the standard of service expressed by it; and the task of the industry should be to maintain this standard. There is every reason for assuming that this, and more, will be done.

REMARKABLE RECORDS OF THE EXHIBITION.

Before closing these notes of the world's greatest exhibition, it is of interest to record some of the remarkable figures which have been revealed. From the date of opening, April 23, to the close last Saturday, 17,400,000 persons have passed through the turnstiles—a world's record; and the average has been 110,000 a day. No less than 20,000 cases have been dealt with by the Medical Service, and 8000 children have been cared for at the day nurseries. As for the catering, about 1 million 2-lb. loaves were eaten, over 5 million buns, and almost the same number of rolls. An idea of the task which Messrs. Lyons have accomplished with such credit to themselves will be gathered when it is stated that roads have been made at Sudbury from the hundreds of thousands of pieces of crockery which were broken during the run of the Exhibition.

Midland Association of Gas Engineers and Managers.—The autumn general meeting of the Association will be held in Birmingham on Thursday, Nov. 27. The programme will be announced later.

ELECTRICITY SUPPLY MEMORANDA.

PERHAPS it is only a passing phase, but it seems to us from our reading of the electrical papers that some men in the electricity supply industry are at present suffering from another attack of envy, hatred, and uncharitableness towards gas. We must expect this sort of thing to be recurrent, when there is recognition of the difficult uphill work that the electrical people have in trying to develop branches of business for which they know electricity to be totally unfitted, though loud in their asseverations to the contrary. When one remembers the paltry prices they have to charge per KW.-H. in order to get as near as they can to a competitive cost with other agents, and then find they are far from home—that is enough to cause irritation. When, too, they realize that installation costs and the prices of appliances, as well as maintenance, are heavy in comparison with other agents, then again perhaps a little irritability is excusable. When they are aware that their heating elements begin early in life to deteriorate, and persist in that course—well then one cannot be surprised (however wrong it may be, and however conscious they are of untruth) that they are sometimes tempted, and yield to the temptation, to say that initial efficiency is maintained until the final collapse comes. For all operations upon which electricians have set their hearts in order to fill up ugly day valleys in their output curve, they are completely beaten out of the field by gas, with its generous heat supply for a relatively modest sum. We must not therefore be astonished if at times vent is given to the annoyance felt, and nasty words are used, insinuations made, and slanderous statements framed and uttered. We are aware of the causes, just as we are of our own strength in the competition.

Temporary Indisposition.

Ill Words.

In this connection, it has frequently occurred to us that some champions of the electricity supply industry are wonderfully adept at mud-slinging. We have an instance of this in a letter which Mr. E. O. Walker, of Manchester, sent to the "Electrical Review," and which that estimable journal, in the exercise of a fine discretion, has published. Mr. Walker appears to be a rich man. He must be, because for over eight years he used electricity for "everything," including cooking and heating. He even employed the energy for a tyre pump, for bed warmers, for a piano, ironing, washing machine, and a garage lathe. It is these people who brag of electricity saving them any and every form of exertion, and thereby advertise their possession of fat money-bags, who make the socialistic and communistic elements of society plan schemes in the air for the provision of similar facilities and comforts for those who can sometimes turn their pockets inside out, and discover that they have not in them the price of a single unit of electricity. Mr. Walker used to get current at ¾d. per unit in winter quarters and 1½d. in summer quarters; but now he has to pay a bit more. Notwithstanding, his view is that with electricity at about 1d. per unit, "gas is not in it." This man of means, however, does not appear to be superlatively courteous when dealing with gas—vast as is the business which is done in it, because the people want it, and will have it. Why? The answer is owing to its economy, efficiency, elasticity in use, and general convenience. The verdict of the multitude is of far more importance than that of Mr. Walker. This person speaks of the danger of being "poisoned or blown up;" of metal fittings that "go rotten," and of dirty ceilings, curtains, &c. Then he swells with pride over the fact that 500 electric cookers have been installed in Manchester; but he forgets to say how many gas cookers are used in the city, and how many have been connected during the same period that the 500 electric cookers have been fixed. Then comes the real tit-bit of the letter. He says: "But for the fact that such large profits are made out of rubbishy gas which enables the Gas Department to supply gas cookers free, and fix them on the same terms, electric cooking would come into its own more quickly than it is doing." What does he mean by "rubbishy" gas? The gas of Manchester, as of other places, is supplied under conditions of control laid down by the Legislature; and a standard of quality has to be complied with. In these circumstances, it is a pity that men who write in the loose way that Mr. Walker does are not brought to book, and made to prove or withdraw their words by an action for trade slander; and it might do certain papers good if they were roped in for publishing and circulating unjustifiable and defamatory statements of the kind.

Opposed to the Regulations.

The new wiring regulations of the Institution of Electrical Engineers continue to serve as food for reflection, and to provoke rebellion against the authors. Mr. L. L. Robinson, the Borough Electrical Engineer of Hackney—who, as seen in previous issues of the "JOURNAL," has been retreating from a challenge issued by Mr. Sam Hall, and offering him as compensation some extracts from a favourite volume of testimonials—has lately been making a weekly contribution to the "Correspondence" columns of the electrical papers. Those which the writer of the "Memoranda" purchases, all in the same week contain a letter from him. This time it is an attack on the wiring regulations. The language he uses regarding these decrees

which were designed for the protection of the public is of very prickly character. Here is an example: The volume of regulations consists of 124 pages of "panic anti-progress publicity literature—a sort of scarecrow to keep the public off the electrical corn which is really intended for their consumption." Purity of style is not a feature of electrical writings nowadays. However, Mr. Robinson treats the regulations to a full measure of contempt; and he predicts that Carey Street would have to welcome contractors who conscientiously carry out the regulations. "Ridiculous regulations," he says, "are always ignored in this country;" and he has no doubt these will be ignored, but it would be better to have them abolished. The enmity which electricians bear towards gas is again illustrated by this exponent of electrical sportmanship. He asks: "How is it that gas—a far more dangerous industry—has escaped all these abominable interferences, though it is known by those who wish to die to be as useful as cocaine or other regulated poisons?" The only answer Mr. Robinson can find is that the gas industry is run by business men of real commercial ability. Another answer is that gas gives evidence when danger is present, while electricity does not. The latter has insidious and secret ways of inflicting harm; and these have to be guarded against as effectually as possible. There is boldness in the announcement: "I, for one, will have none of the new regulations; and I hope that all real believers in the fact that the electrical age has arrived will be with me." That is the ultimatum of our Hackney friend to those wise and patient bodies who sought to revise the regulations, and to prescribe good form in the installation of electricity so that harm should be reduced to the minimum. He thinks it would be far better to secure legislation to make it illegal for incompetent men to put in an electrical installation. He says nothing about the material and design of installation, both of which, if wrong, go far to nullify the competence of the men engaged on the installation work. Electrical men know full well of the numerous defective installations that exist to-day—installations made prior to the revision of the regulations, which revision had for its object the provision of a dam against the extension of dangerous work. Those who howl and scowl over the regulations would, it seems, prefer to continue along the road that leads to trouble and bad reputation—perhaps to destruction.

Too Late!

Good warning and advice was contained in the letter from Mr. G. M. Gill which was published in our "Correspondence" columns last week. There has been evidence of a faster flow in the tide to the combination of gas and electricity undertakings, especially in areas where separate systems and organizations could not very well live in prosperous comfort, but where electricity generation and supply as a component of the gas system could, in view of the better economic circumstances, make headway. We know this sort of thing is not approved by a section of electricity men. Jealousy is at the root of that; but why they should object to a body of men who have had the enterprise to invest money in a gas undertaking not investing more and extending their interests to electricity, instead of forming a separate company, passes our understanding. But objection has no avail. What is economically best for the public is the consideration which has weight with the powers whose duty it is to deal with these matters. But as Mr. Gill says, there is activity now on the part of promoters of electricity undertakings to apply for authorization to supply these smaller districts; and if they secure such powers, it closes the area to the extension of enterprise in this regard by gas undertakings. This being so, every gas undertaking without electrical competition should at once consider the matter of uniting with their business the supply of electrical energy, and so consolidate their position. If decision is favourable, then there should be immediate application for the necessary powers; otherwise an independent proposition may get there first, and then it will be—Too Late That is Mr. Gill's message, and he was prompted to send it because two gas undertakings which were contemplating application procrastinated, and found the door to the new enterprise closed against them through the action of others who had moved faster.

Foolish Extravagance.

"Meteor" of the "Electrical Times" does not like electricity to be regulated in the current fashion. But what matters, except in public places of entertainment, when few seem to pay any heed to rules or standards? He says: "Electricity being in itself the 'safety first' agent *par excellence*, to surround it with costly rules and regulations is like gilding refined gold and painting lilies." Poor "Meteor"! He is not himself if not extravagant in language and manner of expression. His remark leads to reminiscence, and inquiry may be made as to what were the causes that led to the introduction of regulations for installation work, and why have those regulations from time to time been stiffened instead of being relaxed? The answer can be summed up in a word—Experience. He hints that the regulations induce people to use "extremely dangerous lighting agents which are free from vexatious rules and regulations." And in the opinion of this singularly badly informed electrical journalist, that is the reason "why the fatalities per 1000 from fire and poisoning remain so extraordinarily high in this unfortunate country." We should like to suggest to "Meteor" that he should draw from facts and not from his versatile imagination. Everybody knows well enough that he is driving at gas. This being so, would he mind supplying exact figures regarding the "extraordinarily high" number of fatalities per 1000 from fire and poisoning? We want to ascertain the foundation for this childish piece of inflation. When (if ever) he gives us the figures, we shall have something more to say. But previous experience causes us to doubt whether "Meteor" can screw-up courage to give actual data. In this respect he is much like certain other electrical men of whom we know. Another stupid exaggeration is: "The gas industry puts up no skull and cross-bones over its commodity, *people are killed like flies*, and nothing happens." Is that the truth, "Meteor"? If it is not, then "Meteor" might be described by a term which it would be discourteous to put into print.

EFFECTS OF INDENE ON NAPHTHALENE DETERMINATIONS BY PICRIC ACID.

By H. G. COLMAN and E. W. YEOMAN.

In their recent paper of the above title, published in the September number of the American "Journal of Industrial and Engineering Chemistry" (extracts from which were given in the "JOURNAL" for Oct. 29), Messrs. R. L. Brown and H. G. Berger point out, quite truly, that the precipitate obtained when coal-gas is passed through aqueous picric acid does not consist solely of naphthalene picrate, but may contain considerable proportions of indene picrate. They further state that in the past it has been considered that the formation of a precipitate indicates the presence of naphthalene in the gas, and that its amount forms a measure of the quantity of naphthalene present, but that their observations with respect to indene show that the picrate method has been untruthful and misleading.

This last statement is not altogether correct. It does apply to some methods which have been published for carrying out the naphthalene determination by picric acid, but it does not apply to the method as originally published by Colman and Smith in 1900 (J.Soc.Chem.Ind., 1900, *19*, 128). They pointed out that the original picrate precipitate formed by the passage of the gas through the aqueous picric acid could not be regarded as pure naphthalene picrate, and that before this could be used for the quantitative estimation of naphthalene, it must be recrystallized from hot aqueous picric acid; and that if this was done, then the method gave results of reasonable accuracy.

Why this recrystallization was necessary was not fully understood at the time of publication of the paper, but further experience with the test showed that in many cases the picrate formed by the passage of the gas through the picric acid solution contained the picrates of other substances than naphthalene, and that these other substances were of lower molecular weight than naphthalene, and had an unsaturated character. It was found that the result of the recrystallization of the first precipitated picrate from hot picric acid solution was the substantial elimination of these other picrates; the recrystallized material consisting of naphthalene picrate, except for small amounts of higher homologues of naphthalene.

It was found, in agreement with the present observations of Messrs. Brown and Berger, that one of the interfering substances present was indene, but, in addition, in the case of coal-gas a further substance which comes down with the naphthalene picrate is coumarone, which is always present in the gas in quantities exceeding that of naphthalene. Coumarone is almost entirely absent from carburetted water gas, but this gas is usually much richer in indene than is coal gas.

During the past ten years we have carried out a considerable number of tests in connection with indene and coumarone in relation to the picric acid test, and an account of these will shortly be published.

A New Weekly Publication.—"Rating and Income-Tax," a new weekly publication, price 6d., deals entirely with questions of rating and taxation, which take so many hundreds of millions out of the pockets of the public yearly. The contents are specially calculated to be of service to the vast army of officials, accountants, surveyors, and others who deal with these matters professionally, as well as to the individual ratepayer or taxpayer. All rating appeals heard in the Courts will be specially reported, with a view to disclosing the contentions for and against a particular assessment, and to provide a guide for all interested in the valuation of similar property. Articles upon phases of rating will appear regularly (the first is on "Equality in Rating," and is by Sir Trustram Eve, K.B.E., one of the leading authorities in the country on the subject); and all news respecting valuations and re-valuations proceeding or proposed will be carefully collected. Questions on rating problems will be answered. The income-tax portion of the paper will contain in every issue an article upon some aspect of income-tax of general interest to taxpayers and their agents (the first is "Income-Tax and Annuities"); problems confronting taxpayers will be answered by experts; and tax appeals in the High Courts will be carefully reported by barristers and journalists of experience. The London Quinquennial Re-Valuation of 1925 will receive special attention in future issues. The Argus Printing Company, Tudor Street, are the publishers.

THE ECONOMICS OF APPLIANCES FIXED WITH SLOT METERS.

[CONTRIBUTED.]

THERE is in Mr. Samuel Shadbolt's able address to the autumn meeting of the North of England Gas Managers' Association one paragraph of interest to all classes of undertakings, from the smallest to the biggest—that which refers to the experiment of fixing gas wash-boilers as part of the prepayment installation. It is generally acknowledged that, while the inflow of additional consumers is welcome, no efforts should be spared to increase the use of gas among existing consumers. Anything, therefore, which aims at this is entitled to the most careful consideration. There is no novelty in the experiment, nor does Mr. Shadbolt claim it as such, except as regards South Bank. Wash-boilers have been fixed to slot meters for many years elsewhere, either with distinctive hire, or with the hire incorporated in the slot charge. Nevertheless, gas undertakings which fix either wash-boilers or gas fires with slot meters at an inclusive rate of charge through the slot mechanism are greatly in the minority. That in itself is sufficient reason why it is worth while to go more fully into the economics of the practice than Mr. Shadbolt was able to do in his address.

At South Bank there are now four classes of consumer through slot meters. Class A pays 1·8d. per therm above the ordinary rate of charge for a slot meter only; he or his landlord having provided the fittings in use. Class B pays 2·2d. per therm extra, for which he is provided with meter, two lighting points, and a boiling ring. Class C has a gas cooker included beyond the fitments supplied to Class B, and pays 3d. per therm extra. Class D pays 3·8d. per therm extra, and has a wash-boiler supplied in addition to the fitments supplied to Class C.

From the official figures it is gleaned that in 1923 the average consumption per slot meter in South Bank was 16,350 c.ft.; and as the calorific value declared is 400 B.Th.U., this is equivalent to 66·6 therms. The average consumption in the same year over the whole of the United Kingdom was 19,470 c.ft.; and, though the actual average calorific value cannot yet be accurately computed, we may safely take it that the figure closely approximates to 480 B.Th.U., which gives 113·4 therms per slot meter. Thus there is a big difference between the South Bank average and the general average consumption by slot meter. It is common knowledge that the quantity of gas sold through slot meters varies enormously not only in the same district, but when comparing one district with another, so that no particular reflection lies on South Bank because its return happens to fall below the general average. At any rate it is not accounted for by apathy, or lack of desire to increase the output per consumer, as Mr. Shadbolt's address testifies.

Here are the slot results obtained by calculation from the 1923 Board of Trade Returns of four companies and four local authorities, selected casually as showing how diverse is the quantity of gas sold per user:

—	Consumption.		Declared C.V.
	C.Ft.	Therms.	
Companies—			
Gas Light and Coke	21,260	106·3	500
South Metropolitan	27,140	151·9	560
Liverpool	22,370	106 3	475
Bristol	28,540	137 0	480
Local Authorities—			
Leeds	12,080	56·8	470
Manchester	19,450	85·6	450
Nottingham	31,710	150·6	475
Wigan	12,310	59·1	480

No doubt there is a satisfactory explanation why there is such a great disparity. We should hardly expect, for example, that Wigan, being a colliery centre with coal supplies free or cheap to colliers, would be able in any circumstances to yield an average as high as towns where such privileges are not afforded to large numbers of slot users. Even in the Metropolis we see a great difference between the Gas Light and Coke and the South Metropolitan Gas Companies, for which doubtless there is adequate reason, since no one will believe that either Company is not fully alive to the possibilities which its district affords.

Yet, in spite of all explanations, there does seem ground for considering whether all has been done that can be done to increase the patronage of the slot user. One of the most promising fields for this appears to be a greater extension of that system which has done so much to extend the use of gas—the letting-out on hire terms, or hire terms equivalent, of various kinds of heating appliances. Gas cookers have already partaken largely of such privileges, but wash-boilers and fires much more rarely. The consumer by ordinary meter is required to pay hire proportionate to the cost of appliances, and rightly so. The slot user, however, being attuned to discharge his liabilities by prepayment, even when offered hire terms, is not as responsive as the ordinary user. It falls to be examined, therefore, whether, by adjustment of the slot price, the equivalent can be more extensively merged in the prepayment than is now the case.

It is a pity Mr. Shadbolt did not give the average therms sold per consumer at South Bank to *each class of consumer*, as we might then have been able to take that as an illustration of the increment likely to be derived from extending the privileges of slot users. Most gas administrators, however, can work out an exercise of this kind for themselves, either from figures at hand, or from figures that can be derived by making an analysis of the slot users in their district, classifying them according to the different privileges given, as Mr. Shadbolt has done. (If no privileges are offered beyond the provision of meter and lighting fittings, of course, this cannot be done; in such cases experiments on the lines of South Bank are strongly urged.)

At South Bank, as already noticed, the average consumption per slot meter is 66·6 therms. Class A with only meter and lighting fittings will yield a lower average than Class B which also has a griller, Class B a lower average than Class C which also has a cooker, and Class C a lower average than Class D which has both a cooker and a wash-boiler. As the actual averages are not available, we will take hypothetical ones, and assume that Class A is 45, Class B 55, Class C 80, and Class D 100 therms. At these figures, the average weekly consumption, over 50 weeks in the year, of South Bank 400 B.Th.U. gas will be:

		C.Ft.
Class A.	Lighting only	281·5
,, B.	Lighting and griller	343·75
,, C.	Lighting and cooker	500
,, D.	Lighting, cooker, and wash-boiler	625

If the appliances are to be used regularly, it cannot be said that these are extravagant estimates, allowing as they do 62 c.ft. weekly for a griller, 219 c.ft. for a cooker *in lieu* of griller, and 125 c.ft. for the use of a wash-boiler. (It may be here interposed that regular use is vitally dependent upon whether a proper scheme of maintenance or inspection is adopted.)

Calculating for the slot charge we get:

		s.	d.
Class A.	45 therms at 1·8d.	6	9
,, B.	55 ,, at 2·2d.	10	1
,, C.	80 ,, at 3·0d.	20	0
,, D.	100 ,, at 3·8d.	31	8

Thus, on the hypothetical example taken, there is yielded a return above the ordinary gas price of 6s. 9d. for the provision of a meter (per annum), 3s. 4d. for a griller and lighting fittings, 9s. 11d. for a cooker and its fixing, and 11s. 8d. for a wash-boiler and its fixing. Practice varies as to the size of slot meter provided, the type of griller and number of lighting points provided in a slot installation, the type of cooker, and the size of wash-boiler. If we assume that the meter and its fixing cost £3 10s., the lighting points and griller £2 10s., the cooker £5, and the wash-boiler £3, the return, on the example given, will be respectively 9·6, 6·6, 10·0, and 19·0 p.ct. per annum on the outlay incurred.

Though the example is hypothetical, it is worked out in such a way that anyone so disposed can substitute the actual figures afforded or likely to be afforded by any particular undertaking, and so arrive at reasonable conclusions as to the potentialities of extending the provision of appliances to slot users.

It must be remembered that, as the consumption per consumer increases, the true profit to an undertaking, after the cost of providing appliances has been met, rises at a greater ratio than the actual rate of increase in consumption. The service and the meter have to be provided whether consumption is big or little, meters have to be read or cash collected, and in many other little ways standing charges have to be met which do not increase when the turn-over per consumer increases. In order to induce a bigger sale per slot user, therefore, it must not be taken as necessary that the slot difference shall be sufficient to defray the whole of the cost of providing appliances. As a general proposition it would be safe to say that if half the cost of interest and repayment on the first cost of providing cooker, wash-boiler, or fire was met by the slot difference, the undertaking would be on a sure basis of reaping a profit on the transaction, owing to the much lower cost of producing and supplying the extra gas required. This argument need not be further pursued; it can be tested by individual balance-sheets, from which it may be ascertained what is the existing cost of gas-making, and what it would be if the sale was 10, 20, 30, or 40 p.ct., greater without any increase in the number of services required or the number of consumers supplied.

If grillers, cookers, and wash-boilers can be fixed at an "all-in" price by the slot mechanism, it is worth considering whether the same can or cannot be done with fires. Perhaps Mr. Shadbolt may be drawn later on to make an experiment in this direction if, as the writer anticipates, he finds the wash-boiler proposition a sound one. Gas, we are told, can beat electricity hollow where heating propositions are concerned. That hardly affects slot users, who resort to coal for regular heating. Still, they might be educated to using gas in bedrooms in which event proper safeguards would have to be taken against the possibility of the gas shutting off at the completion of a prepaid allowance, and coming on again on the insertion of fresh coins by persons who have forgotten or not known that the fire has been in action.

The more one reflects upon the slot system, the more convincing it becomes that its fullest development has not yet been reached. This is even more the case with local authority undertakings than with companies, for a glance through the average consumptions per meter reveals that, as a class, they are far behind companies. The most likely explanation is that they are not as enterprising in providing facilities for using gas appliances as are

the companies; yet, as the public custodians of local social welfare, the position ought to be the other way about.

If these observations result in bringing the slot system under fresh examination, the writer's object will have been attained, and a further compliment paid to Mr. Shadbolt for his thoughtful address, whereby these reflections have been inspired.

COAL CARBONIZATION.*

Reviewed by Dr. A. Parker, F.I.C.

The Board of Editors of the Technologic Series of Monographs published under the auspices of the American Chemical Society are to be congratulated in having secured an author so well qualified to write on the subject of coal carbonization. The author was for some years associated with the work of the experimental station of the U.S. Bureau of Mines, and he has since practised as a chemical engineer concerned with fuel problems in America. The subject is therefore dealt with from the American standpoint, but this does not in any way deprive it of interest to the British gas industry.

An excellent introductory survey is given in the first four chapters. The advantages and disadvantages of coal carbonization are discussed, and the possibilities of future development emphasized. The opinion is expressed that coal carbonization cannot displace all, or even most, of the other forms of fuel application. It will grow until it supplies as much of the coal bye-products as are needed, and supplants less efficient and more costly fuel-consuming methods. For steam power production, through the medium of coke and gas as fuels, with the recovery of bye-products, coal carbonization does not, under present conditions and methods, offer great promise of success. It is chiefly in certain definite fields realizing particular advantage from the use of these special forms of fuel, that the products of carbonization offer to the consumer adequate inducement to pay the costs of their manufacture. The field thereby offered is large, possibly one-half or more of the total coal consumption. Gas applied to the reheating of metals for rolling, shaping, annealing, and the many various kinds of reworking, secures economies over coal, by virtue of labour saving, increased rate of output, improved product, and reduced waste. In the domestic fuel field, gas and coke or semi-coke are gaining ground rapidly in replacing coal, owing to the indirect advantages secured by smokelessness, convenience, labour-saving, and reliability.

With regard to distribution, the author believes that costs, now disproportionately heavy, may be lowered by systematizing delivery in trunk lines at high pressures over long distances, with low-pressure sub-stations for final distribution.

The very interesting problem of devising an equitable system of charges to the consumer is discussed in one of the sections of the fourth chapter. The author states that this is unquestionably the largest factor in the future expansion of the gas industry; and he suggests that a three-part rate structure should be given serious consideration. The three-part rate includes:

(*a*) The customer charge (a fixed charge per annum).
(*b*) The maximum demand charge (an annual charge based on the maximum amount used in any hour or twenty-four hours).
(*c*) The commodity charge, in which the large consumer may also be given the benefit of a step rate diminishing with increasing use.

Though the rate structure of charges as suggested in the book under review appears to be complex, the underlying principle is worthy of serious consideration by gas undertakings in this country, in so far as may be compatible with legal obligations. A similar system has already been adopted by certain electricity undertakings. To give an example, an electricity undertaking which ordinarily charges 5d. per unit for lighting and 1½d. per unit for power or heating offers an alternative system of charges to householders as an encouragement to instal electric cookers, fires, &c. The alternative method consists of an annual charge of 15 p.ct. of the rateable value of the house, *plus* ½d. per unit consumed. This alternative system of charges has resulted in considerable expansion of business, and consequently in increased competition for the gas industry.

Since the book under review is concerned mainly with American practice, the coke-oven industry is considered in more detail than is the gas industry, which does not occupy the same prominent position which it does in this country. The author appears to be well acquainted with modern practice; but it is surprising to find that in his description of the process of steaming the charges in vertical retorts he makes no reference to the first systematic investigation of this subject—viz., that of the Gas Investigation Committee of the Institution of Gas Engineers. Further, if the author had studied the reports of the same Committee on the manufacture of blue and carburetted water gas, it is difficult to understand how it could have been concluded that the cracking of oil in the enrichment of water gas is relatively an inefficient process. In reference to different grades of gas, the statement that the curve of cubic feet consumption, for equal performance, does not rise in proportion to the decrease of heating value is also somewhat misleading, as it stands without amplification or verification.

The subject of low-temperature carbonization is considered in one chapter, but in the opinion of the author no process has yet shown its ability to carbonize coal at costs well within the revenue to be derived from the products. The fundamentals of carbonization have not been neglected. Two chapters are devoted to the nature of coal and the chemistry of carbonization, including nitrogen and sulphur compounds. The book, which is well written, includes a large number of useful references; and the reviewer strongly recommends that it be added to the library of every technician and student interested in carbonization.

* "Coal Carbonization," by H. C. Porter, M.S., Ph.D. American Chemical Society Monograph Series. Published by the Chemical Catalog Company, Inc., New York. Price $6.

COMBINED GAS AND ELECTRICITY SUPPLY.

Mr. A. Hugh Seabrook, M.I Mech.E., M.I.E.E., emphasizes its Advantages.

An article is contributed to the October number of the "Fuel Economy Review" (issued by the Federation of British Industries) by Mr. A. Hugh Seabrook, on the subject of "Fuel Conservation and Electrical Generation," in which he remarks that a hurried expenditure of millions on super-generating stations might easily result in a power price to an industrial consumer of a non-economic order when compared with either self-supply or supply from a local unit in a closely-defined area. The country cannot afford wastage of capital on schemes which, being of grandiose conception, may appeal to the politician and the man in the street, but which cannot stand when the test of a reasoned scrutiny from the one and only basis—economic advantage—is applied.

Thermal Efficiency and Transmission Costs.

It is strange, says Mr. Seabrook, that the direct coal-fired generating station is accepted blindly as the principle to be adopted. In the recent report of the Electricity Commissioners it is recorded that the highest thermal efficiency was obtained by a very small internal-combustion engine station; and a detailed analysis of the results shows that the big generating stations have by no means the monopoly of high efficiencies. A further consideration accrues from transmission difficulties. With the small station, capital cost of transmission lines and actual power loss in transmission are small. With the large station supplying an extensive area costs are heavy and the power loss is considerable. Thus, if the actual price to the consumer is the determining factor, there comes a point at which transmission becomes non-economic.

Coke for Electricity Generation.

By far the larger part of British coals is rich in bye-products which have no equalizing comparative value from the calorific point of view; and such coals are being burned daily in boiler furnaces. Gas and electricity are of such national importance that only by the closest co-operation in the selection of coal best-suited to each industry can our fuel supplies be most efficiently utilized. In 1916 at a large generating station in the London area, after considerable trials, coke breeze was burnt in water-tube boilers with satisfactory results. To-day other electricity stations in London are using as much coke breeze as they can obtain. Thus there can be no doubt that coke breeze is an economic fuel for steam raising for power generation purposes. When it is realized that in a certain case the transit cost was practically 50 p.ct. of the total cost of the fuel, the saving which would have been effected by having a conjoint station is of immense magnitude. Much more could be done than has been done in the past by generating electricity at coal carbonization centres, using either coke or gas or both for fuel, instead of blindly pursuing the system of generation as contemplated to-day. A transmission or interconnecting line (say) of 20 miles can have its current-carrying capacity enormously increased if it is fed from several points at which electricity can be supplied. There are, no doubt, considerable areas in this country where such a co-ordinating scheme could be effectively introduced. This would, in effect, mean a supply of electricity in thinly-populated areas by using existing facilities—namely, existing gas-works with a carefully devised system of "thin" inter-connecting transmission lines which could be erected at a very reasonable capital expenditure, as distinct from running expensive transmission lines from super-stations at great distances away.

The Combined System.

Mr. Seabrook has been connected recently with three joint schemes, one of which has completed its first six months' work. The output and load are extremely small, the total capacity is only 125 KW., and the load has not reached a quarter of the plant capacity. However, the actual working figures are of interest. For the whole of the six months the fuel consumption (gas being used) was only 38,000 B.Th.U. per unit—a thermal efficiency very much over that of many stations of a million units per annum output as shown by the Commissioners' Report. During the period only 31,000 units were produced, which leads the author to estimate that this small gas-engine station will by the end of its second year be producing the unit at an expenditure of 20,000 B.Th.U.

Working of Small Plants.

If possible town gas is used. This is to minimize the cost of labour and attendance, which becomes negligible, as may be

shown by the fact that the total labour and attendance cost for the plant mentioned works out at only £12 10s. for the whole of the half-year's working. In other plants water gas and carburetted water gas are used.

HYDRO-ELECTRIC POWER.

Regarding hydro-electric power, it is the sanest proposition to carry such a load as far as possible, as there is no question involved of destruction of any exhaustible national asset; but where fuel is consumed the question of the most advantageous use of coal must not be overlooked. One must not be blinded by the fact that X, Y, Z countries are introducing schemes which may be economic in those countries owing to their physical conditions. Arguments based on such slender hypotheses must not be allowed to influence the country into neglect of the economical aspect, which, if ignored, as there is a tendency to do, would inevitably result in increased final debits due to replacing, scrapping, &c., all of which would simply result in an increased price to the consumer.

CANADIAN GAS ASSOCIATION.

Meeting in Toronto.

Over 200 delegates attended the completely successful seventeenth annual convention of the Association, which took place some weeks ago in Toronto, under the Presidency of Mr. C. A. Jefferis. Among a number of visitors from this side of the water, Mrs. Ethel M. Wood, C.B.E., represented the British Commercial Gas Association.

In his address, the President made reference to the fact that the total membership of the Association is now 138, and to the bright future that lies before the gas industry. The following office-bearers were then elected:

President.—Mr. E. R. Hamilton, of Halifax, Nova Scotia.
Vice-President.—Mr. J. J. Humphreys, of Montreal.
Second Vice-President.—Mr. P. V. Byrnes, of Hamilton, Ontario.
Secretary-Treasurer.—Mr. G. W. Allen, No. 7, Astley Avenue, Toronto.

The first paper read was by Mr. W. H. Earle, Superintendent of the Gas Manufacturing Department of the Rochester (N.Y.) Gas and Electric Corporation, and in it he dealt with some recent gas manufacturing developments at his works, these taking the form of additional water gas plant, equipped with waste-heat boilers, and with up-to-date accessories. In connection with the vertical retorts, a coke pusher has been installed. The machine was designed and built by the Welman-Seaver-Morgan Company, of Cleveland, and is mounted on the same rails which carry the coal charging larry. It is electrically operated throughout, and carries three rams with pusher heads properly sized to enter the upper mouthpiece. These heads are slightly concaved, with the idea of preventing the spreading of the coke column. A total pressure of 21,000 lbs. can be exerted by the machine, and this pressure may be divided over the three rams acting simultaneously, or may all be exerted on any one ram acting alone. A row of three retorts constitutes a unit. This pressure may be reduced to any point by adjusting the overload relay, which kicks out the circuit when the established pressure is exceeded. The machine is equipped with interlocking devices which prevent the operator from moving the rams when the carriage is in motion, or moving the carriage except when all three rams are in their top position. It is also provided with means for propelling it or raising the rams mechanically in case of power interruption. The handle used in this operation is part of the electric switch, and consequently, when the handle is in use, the circuit is open. This prevents the machine from becoming electrically affected in case the power returns while it is being mechanically operated. A novel feature is in the construction of the rams. The retort house did not afford headroom enough to allow a complete vertical travel of the rams, so they were jointed. Each ram is divided for a portion of its lengths into two pieces, with a knee joint. These sections open-up as the rams are raised, being guided off into semi-horizontal positions. In the downward travel, the joint moves below the guides; but it is self-locking, and is perfectly rigid.

The industrial gas situation was dealt with by Mr. F. F. Cauley, Manager of the Industrial Gas Sales to the People's Gas Light and Coke Company of Chicago, who said that, in analyzing the industrial gas situation, it is interesting to note that, while gas has been manufactured and sold in the United States since 1816, statistics show that in 1911 about 5 p.ct. of the quantity sold was for industrial purposes, while in 1921 the sale of industrial gas reached 25 p.ct. of the total gas output in the country. This is certainly a substantial and encouraging increase. After urging the importance of advertising, he said the next important thing is to improve and build-up the industrial sales organization. He is a believer in gas companies taking a certain number of engineering graduates into their organizations every year, in accordance with the size of their undertakings. The industrial gas business is the field for the gas industry's expansion. This business, however, requires study, hard work, and perseverance.

Mr. E. S. Stanton, Superintendent of Gas Distribution to the Montreal Light, Heat, and Power Company, described some machinery in the gas distributing department, consisting of a trenching machine which has been in operation since 1912, and has paid for itself and been written-off long ago. It cost $5000, and it is estimated that it does with one man the work of about twenty-four.

Some observations on the relative value of fuels were offered by Mr. R. O. Wynne-Roberts; and Mr. J. S. de Hart, Jun., President of the Isbell-Porter Company, described gas manufacturing plant for the Iroquois Corporation, of Buffalo, N.Y., consisting of a modern Woodall-Duckham vertical retort coal gas installation and a blue water gas plant, arranged to operate as one unit when necessary completely to gasify 250 tons of coal a day.

Mr. W. A. Harden, Gas Manager at Belleville, Ontario, gave a short account of a recently installed Tully gas plant at his works, capable of making 240,000 c.ft. of gas a day of any desired calorific value, with additional use of gas oil. The average calorific value of gas since the Tully plant took the full load has been around 455 B.Th.U.

House heating was discussed by Mr. H. E. G. Watson, Superintendent of the Industrial Department of the Consumers' Gas Company of Toronto, who urged the convenience and reliability of gas for this purpose. It helps, he pointed out, to conserve the family health, and is invaluable where there is sickness.

Several reports of Canadian representatives on American Gas Association Committees were also submitted to the meeting.

WALES AND MONMOUTHSHIRE JUNIOR GAS ASSOCIATION.

Visit to the Works of the Ebbw Vale Steel, Coal, and Iron Company, Ltd.

The Association's second meeting of the session was held on Thursday, Oct. 30, when, by the kindness of the Directors of the Company and the good offices of Mr. W. Valon Watson, a visit of inspection of the Ebbw Vale Steel, Iron, and Coal Company's works was made. The attendance was exceedingly satisfactory. The members were met at Victoria by Mr. W. Valon Watson, and under the guidance of the Manager of the blast-furnace plant (Mr. Riddlesdale) and his assistants, proceeded from this point to observe some of the operations of this great undertaking. The blast furnaces and the adjacent works plant were the first objective of the parties; and the feeding of the furnaces with ore, limestone, &c., and the subsequent running-off of the molten metal and the moulding of pig iron were witnessed. The boilers burning coke-oven and furnace gases constituted a special item of interest. Continuing their journey, the parties were shown over the coke-oven and bye-product plant by Captain Salwey Browne. They saw a discharge of coke, and made a tour of the sulphate of ammonia plant. The sheet mills and galvanizing plant were next visited. The parties proceeded by way of the rolling mills to the Bessemer steel plant, seeing *en route* the various processes.

A tour of the gas-works, the property of the Ebbw Vale Steel, Iron, and Coal Company, was then made, and the plant was inspected. Coke-oven gas is at present being supplied; the retort plant being maintained as a stand-by for emergency use. The general offices of the Company were next visited, and there the members of the Association proceeded to partake of tea, kindly provided by Mr. W. Valon Watson.

A short meeting was subsequently held.

The PRESIDENT (Mr. B. J. Bell), in moving a hearty vote of thanks to the Directors of the Ebbw Vale Steel, Iron, and Coal Company, Mr. W. Valon Watson, Mr. T. Evans, and the courteous guides, said that they had been afforded a splendid opportunity of visualizing the activities of the firm. It was certainly not unusual for their members to be given an opportunity of visiting works, but it was unusual for them to see a works such as they had inspected that afternoon.

Mr. T. A. CANNING, seconding, said their present visit had been most instructive and pleasant, and the Association highly appreciated the kindness shown to them.

Mr. W. VALON WATSON, in reply, said it had been a pleasure to him to meet the Association; and by their appreciation he felt amply repaid.

The PRESIDENT announced that a further new member had been enrolled, Mr. D. Bourdice, Cardiff. He then informed the members of the next meeting, which will be held at Aberavon on Saturday, Nov. 29.

The Rush for Gas Fires.—However slack trade in general may be, there is no slump at the moment in the sale of gas fires. The gas undertakings are simply inundated with orders. One London Company which fixed no less than 30,000 gas fires during last autumn and winter has prepared for a much greater amount of work this year. Its orders to meet the first part of the rush during the cold season were for 24,000 new fires; and probably every one of these appliances will be fixed and in use by Christmas. Truly these figures for just one of 1400 gas undertakings in the country are stupendous. The current issue (No. 128) of "A Thousand-and-One Uses for Gas," from which these particulars are taken, mentions them in order to impress upon readers the importance of ordering their gas fires at once, so that they may not be disappointed by delays in getting them fixed. This issue contains a large number of illustrations of very beautiful model rooms in the showrooms and houses of well known builders and furnishers, and may be obtained free of charge from the Secretary of the British Commercial Gas Association, No. 28, Grosvenor Gardens, S.W.1.

MIDLAND JUNIOR GAS ASSOCIATION.

First Meeting of the Session.

The First Meeting of the new session of the Association was held last Friday, in the Reading Room of the Council House, Birmingham.

Mr. L. H. THOMAS (the retiring President) occupied the chair at the outset, and expressed regret at the absence of Mr. H. R. Hems (the Hon. Secretary), who was in hospital making, he was glad to say, a good recovery following an operation for appendicitis. In the absence of Mr. Hems, the work would be undertaken by his assistant, Mr. Summerton. Mr. J. H. Gee, B.Sc. (Central Laboratory, Nechells), became the Senior Vice-President, and Mr. C. F. Tooby (Coventry) had consented to accept the position of Junior Vice-President.

It was announced that the Council had approved four applications for membership.

A letter was read from Mr. J. Ferguson Bell (the President of the Institution of Gas Engineers) saying that, in consequence of the Municipal Elections, he was unable to be present, but looked forward during his year of office to attending one of their meetings. "I am pleased to observe," he added, "that you have elected Mr. Harry Clark to be your President this year, and well know he will ably fulfil all the duties. I should like to take this opportunity to emphasize the importance of the union of science with practice, and that real progress can only be effected by its application in ascertaining fundamental principles. I wish the Association a very prosperous session."

Mr. THOMAS said the Council were pleased to receive that letter. It was not often they were honoured with the interest of the President of the Senior Institution. They felt highly gratified to know that Mr. Bell intended to pay Birmingham a visit; and the Council had written assuring him of a hearty welcome when he came.

Mr. THOMAS then asked Mr. Harry Clark (Superintendent, Distribution and Gas Sales Department, Derby, the new President) to take the chair. Mr. Clark's work was well known to them. He had been connected in many capacities on various committees for the Institution of Gas Engineers and for the National Gas Council, and the Association had done well in electing him. Mr. Clark had been associated with Mr R. J. Rogers (who was present at the meeting) on several committees.

The President, Mr. HARRY CLARK.

Mr. CLARK, who had a cordial reception on rising, said he appreciated the kind remarks of Mr. Thomas, and felt he would be very remiss if he did not warmly acknowledge the work of Mr. Rogers for the Gas Council. Mr. Rogers had done a vast amount of work, and perhaps reached the pinnacle of his success in his able conduct of the negotiations before the officials of the Board of Trade and the Ministry of Health, in relation to model by-laws. Almost wholly through Mr. Rogers' efforts, these by-laws were modified, and from the point of view of the gas industry were altered to its advantage. Proposing a vote of thanks to the retiring President, he stated that most efficient service had been rendered during the past year by Mr. Thomas, and they much valued what he had done.

Mr. J. H. GEE seconded the resolution, which was supported by Mr. C. F. W. RENDLE (Redditch), and heartily carried.

Mr. THOMAS, in reply, said that a real stimulus for work was given by an Association which was alive, but this work could not have had the results it had, but for the support of the Council and the members generally.

Mr. HARRY CLARK then read the following

PRESIDENTIAL ADDRESS.

Gentlemen,—I thank you most cordially for the honour and confidence you have reposed in me by electing me President of this Association. I will endeavour to maintain the high standard which has characterized the work of our presidents in previous years.

I propose to deal chiefly with the distribution and selling of gas, in the light of present-day keen competition, when more serious attention than has ever been known before is being given to actual working costs, and convenience in the home and factory. We must face the fact that our competitors are endeavouring to oust the gas industry. Tremendous inroads have already been made into our lighting load; and now a combined and determined attempt is in progress to capture our power load. Further, the efforts to obtain a position in our heating load are not to be ignored. We live in an age when the switch fever is the chief factor, almost independent of the actual working costs; and whatever arguments are used against the extra cost, we are informed from all sides that convenience more than balances the additional outlay.

INTENSIFIED COMPETITION.

It is remarkable how some of our former arguments advocating the use of gas are now turned-down as being worn out. Recently a consumer was not satisfied that he was getting power at the lowest cost from a rather old 56 B.H.P. town gas engine. With a view to satisfying this person, I arranged for an I.H.P. test to be made, quoted a special price for supplying and fixing a modern gas engine, complete with foundations and shafting, &c., and also gave a time limit for the work. Our competitors came along advising oil or suction gas engines at cost price, with this remarkable additional offer—to reduce the cost of the engine by £100 on one condition, that they could have the opportunity of showing prospective customers the engine working during working hours only. Surely this is intensified competition; but we have nothing to fear providing we adopt a much more progressive policy in dealing with all kinds of gas apparatus, the construction and details of which form the major part of my address.

ADVICE INSPECTORS.

Dealing with competition, the canvasser will have to be educated and trained much more in the future than in the past, for it is almost impossible to exaggerate the value of really first-class canvassers, or what I call "advice inspectors," who, of necessity, get into direct touch with the consumer. It is essential for these men to have had experience as practical gasfitters. The knowledge gained soon enables them to secure the confidence of the consumer. To substantiate their value, I give figures of the actual sales of gas apparatus by one of our advice inspectors. During the last year these amounted to over £5000, and for the first six months of this year his sales total over £2500, which includes nearly 400 gas cookers, fires, geysers, and coppers. The figures quoted are actual district sales; and this is largely due to the advice inspector being on the spot with his practical knowledge and attaché case. Numerous instances can be given where the services of first-class canvassers have been appreciated by consumers, for the simple reason that they have been assisted in decisions at their homes or factories; and this is sometimes difficult even in the most up-to-date showrooms.

WHERE THE INDUSTRY IS WEAK.

The cooking load will eventually constitute the mainstay of our gas consumption. Therefore it is of vital importance that a great deal more should be done to maintain efficiency. Generally speaking, the condition of cookers in use is not as good as it should be. Many thousands of cookers have been constantly employed for years, and consumers have been content to pay rent for hire, enjoying such maintenance as the gas undertakings have thought fit to give. While little attention appears to have been sufficient in the past, the gas industry, if it is to retain the cooking load, must make a more definite effort to increase materially the efficiency of cookers. I give some suggestions which could easily be carried out to the advantage of consumers and the industry:

(1) In all cases where there is a change of tenancy, the cooker should be either changed or brought away, thoroughly cleaned and modernized, and returned free of cost to the incoming tenant.

(2) Consumers, whether they own or rent a cooker, should be able to have it cleaned and returned at a normal cost of 10s.

(3) Gas undertakings should allocate a certain sum of money to be spent each year in modernizing cookers—the whole of the cookers in use to be completed within five or ten years. The exact number could be regulated each year, according to the size of the undertaking.

(4) To meet the cases of consumers who were not prepared to wait until their particular district was being attended to, the gas undertakings should be prepared to remove, modernize, and re-fix cookers which have been on hire for many years, at a nominal charge to the consumer of (say) £1.

I suggest that, if such a plan could be generally adopted, then all concerned would materially benefit, and the consumer would appreciate the fact that a definite attempt was being made to give him the maximum value for every cubic foot of gas consumed.

Now I come to a matter which is far-reaching and of vital importance to the industry. I refer to gas appliances which have been supplied and fixed. No one recognizes and appreciates more than I do the vast improvements the manufacturers have made during the last few years; but I feel that the time has arrived when more serious attention should be given to removing defects. I have on view here for the benefit of the members, and also to demonstrate my remarks, several parts of gas appliances, each of which, in these days of efficient organization, I claim falls below the standard of present-day engineering production.

A. Four rail taps from a sample gas cooker. It will be observed that each tap is defective, the pins not being central, and the brass sleeves slipping over the threads.

B. Gas-fire burner heads which have been found most unsatisfactory. We are now compelled to bear the expense of changing these throughout the district.

C. Gas-fire injector, the design and principle of which have been proved to be entirely wrong, with the result that this type has now been discarded.

D. Two interiors of well-known water heaters, which have, with ordinary wear and tear, been burnt through in twelve months—

a defect which could easily have been obviated during construction.

E. Gas-iron injector. Again the design and principle have been proved entirely wrong. This type is not now supplied.

F. Illustration of a swing hotplate of a gas cooker, which is now being fixed in new houses. The design and construction of this cooker is over eighteen years old.

The following are extracts of letters which further emphasize the points I have raised:

Complaint.—"We are receiving numerous complaints from consumers to the effect that immediately the gas fires are lighted, small pieces of fuel fly all over the room. As a result, we have been asked to remove the gas fires, to enable the consumers to revert to coal fires."

Makers' reply.—"We are extremely sorry to have to admit it, but we were unable to detect the defect before sending the fuel out. We obtained supplies from elsewhere, and, not suspecting that anything was wrong, we failed to test them."

Complaint.—"This burner was fixed immediately above a new billiard table; and after lighting, several pieces of surplus metal dropped from the burner on to this table, doing damage. In view of the fact that this consumer has only recently decided not to install electric light, we consider this most unfortunate, and shall be, glad to know your views on the matter."

Makers' reply.—"It is with much regret that we learn of the trouble this fitting has caused your consumer, but we discovered after your order was executed that the fittings were not absolutely reliable, and we therefore discontinued their use forthwith."

Complaint.—"We are receiving complaints from consumers who have had these washing coppers installed, to the effect that they are unable to finish washing because of the failure of the gas supply to the copper. Upon investigations we find that there is a certain quantity of water inside the gas burners, which is due to the close proximity of the burners to the bottom of the coppers, and to condensation on the bottom."

Makers' reply.—"We have taken a few burners haphazard from our stocks, and find that it is not possible for water to collect in the burners, when these are fixed correctly, and restrict the gas flames. However, your observation has brought to our notice the possibility of the burner carrier becoming bent in transit or fixing. If water is then poured into the burner, the flames will not light."

I conclude this section of my address by submitting to you an illustration and connection of a gas cooker which has recently been fixed in large numbers in various parts of the country. This is another instance where a gas appliance has been supplied and fixed without test under actual district conditions, with the result that numerous complaints show that there is insufficient gas at the burners, this being due entirely to the small bore of the gas connection, which is only ¾ in. Special mention must be made of the fact that through lack of co-ordination between the manufacturers and the gas undertakings, this particular type of gas apparatus is produced and fixed without full knowledge of the actual working conditions, and it is the inevitable lot of the local undertaking to receive the consumers' complaints.

I make the bold statement that such defects reveal a glaring weakness in the industry. Definite steps should be taken to provide our consumers with apparatus of much sounder engineering design and construction, and with better fittings. Would a mechanical engineer recognize these specimens as the products of present-day engineering workshops?

We have now reached a position without precedent in the long history of our profession; and I feel that we are not yet equal to the task of giving the consumer what he really requires. We must remember that in these days the consumer accepts our advice as to the right type of apparatus to instal, and therefore we are under an obligation to take the necessary steps to obviate such defects as I have shown. I have no intention of making a target of any particular firm, for all have done their best; but their best is not sufficient in these days, when our competitors are specializing in the perfection of details in construction of appliances. We have to remember that, when gas apparatus is supplied and fixed by persons other than the members of gas undertakings, the responsibility of the former immediately ceases, leaving the gas undertakings to deal with complaints which arise from the fixing, and sometimes the construction, of such apparatus.

In the manufacture of gas we have on all sides conclusive evidence that the pinnacle of perfection has almost been reached. Again, for the first time in history, we have what may be called "standard" gas of uniform quality and pressure being sent out into the districts from the various works. The Gas Regulation Act of 1920 is now in full force, and our manufacturing departments deserve credit for the very able manner in which they have conformed to the statutory requirements. Therefore, it should be our chief concern to see that more is done to enable the consumer to obtain the maximum efficiency for every cubic foot of gas consumed. We must fully realize that "random" or "rule-of-thumb" days are past, for the advent of the scientists and chemists has revealed that it is possible for the consumer to benefit materially through our efforts to raise the standard of efficiency coupled with the lowest costs.

The excellent pioneer work which has been accomplished by the National Gas Council and the British Commercial Gas Association indicates that the industry is at last particularly well organized; but a great deal of their splendid efforts will be lost unless this important question of gas fittings and appliances is tackled on a national basis. In the near future we juniors (so-called) will be called upon to hold the reins of the industry. Are we content to let this important matter lie on the table, when in due course other juniors will ask, "What have you done, you leaders of the industry?"

This is an age for men to stand up and ventilate with courage their convictions. We must make, distribute, and sell our commodity so that the consumer shall have the best possible results. With the evidence of defects before me, and the knowledge of so many of what can only be called "selling stunts" in gas apparatus, I suggest that the time is ripe for action. Let it be an established fact that only fittings and appliances which have passed the test, and carry the stamp, of the National Gas Council will be supplied and fixed by the industry. We have abundant proof that this is by far the most effective remedy; for during and since the advent of the National Gas Council standard cookers, in the construction of which all gas undertakings were invited to assist, and willingly responded, there has been more progress in the design and efficiency of cookers than in the whole of the previous twenty years. In other words, the industry supplied the practical knowledge and a strong dose of ginger—with immediate effect.

I have spoken strongly, but the occasion demands it. During twenty-five years spent in four large centres, it has been my experience to investigate dissatisfied consumers' complaints; and invariably I have found that the cause was cheap fittings and appliances. I naturally ask how much longer will it be before the industry deals with the matter in the same way as it has dealt with the cookers? Organization would eliminate these elementary defects. Difficulties are ahead, but they can be overcome in the same manner as they were in the change to the therm. Our consumers are entitled to the fullest consideration, for we have ample proof that increased business follows an efficient service.

WHERE THE GAS INDUSTRY IS SLOW—POWER.

We have evidence from all sides that the industry will be compelled to concentrate even more upon maintaining the power load, for to-day we are faced with keener competition than has been experienced in the history of our industry. Oil is by far the most formidable competitor, for this fuel is offered on such terms of elasticity as to meet any possible contingency, and it becomes increasingly difficult to increase or even to maintain our power load. The oil industry is out to capture the power load at almost any cost, in spite of the fact that consumers have not any safeguard in the future price of oil, whereas town gas is supplied by authorities who are bound by statute, and this to a very large extent is in favour of the consumer. Speaking from a long experience, I feel convinced that if we are to maintain and increase our power load, and to stand foursquare against all kinds of power competition, two definite actions must be taken:

(1) Substantially reduce the price of gas for engines over 20 B.H.P. normal to (say) 1s. 6d. per 1000 c.ft., or its therm equivalent.

(2) Supply and fix gas engines on the hire system.

In connection with my first suggestion, we must fully realize that if we are to compete successfully we must make a considerable reduction in the price of gas. As a comparison between town gas and electricity, with town gas at 1s. 6d. per 1000 c.ft., the cost of power production equal to 1 unit of electricity would be 0·44d. This figure is arrived at by taking the consumption of gas of a modern engine at 18 c.ft. per B.H.P.-hour.

Take furnace oil in bulk at £5 per ton. The cost per B.H.P.-hour is approximately 0·27d.; the consumption being 0·5 lb. per B.H.P.-hour. We must take into consideration that the initial outlay on a crude oil engine is about 20 p.ct. higher than on a town gas engine, and the depreciation is also much higher, owing to the high compression which must be maintained. Further, the attention required is considerably more. The cost of town gas at the price suggested would be about 0·33d. per B.H.P.-hour.

I suggest that the very low distribution costs in connection with the power load are not fully realized—such as four meter readings, four bills, and four checks per annum. I find that seven power consumers have used no less than 27,452,000 c.ft. of gas during last year; and when we consider how much capital would have to be spent in mains, services, cookers, &c., for the equivalent amount of gas to be consumed otherwise, we then fully understand the necessity of reducing the price of gas to the lowest possible figure. The loss of a gas engine with its constant day load must be considered a set-back to a gas undertaking.

In dealing with my second suggestion of supplying gas engines on hire, I give a basis which shows my proposal to be a sound business proposition. Take a 20 B.H.P. engine. The approximate cost of supplying and fixing, including foundations, would be £160. Add £20 for interest and another £20 for depreciation and upkeep, making a total of £200. Though the life of this engine would certainly be fifteen years, I divide the £200 into 120 monthly payments of £1 13s. 4d. each, which is just over 8s. per week, and covers a period of ten years, at the end of which we have reimbursed ourselves entirely for the outlay, including interest and depreciation.

Many will disagree with my proposal for the hire of gas engines. My reply is that sooner than risk the possibility of losing the engine, it is far better to replace with an up-to-date engine on hire the old type of gas engine which has become inefficient and uneconomical in working, and of which there are so many in various

parts of the country. Scores of engines have been lost through lack of enterprise on the part of the industry.

Up to a point hire-purchase has assisted us in our endeavours to retain the power load, but events during the last twelve months have revealed the fact that consumers are not prepared to spend capital in new plant when electric motors can be had on hire. I feel sure that, if the hire system could be generally adopted, the gas-engine makers would be glad to co-operate with us by extending the payment for new gas engines over a period of years. It is a common occurrence to find gas engines which have been working from fifteen to twenty-five years; and this in itself should be sufficient guarantee to all the three parties involved. If the gas industry is to grow, then much more will have to be done for the consumer in the future than has been done in the past. If business is to be retained and increased in the future, then more risks will have to be taken. There need be no fear when we have a good article to sell at a reasonable price coupled with the most efficient service that can be given.

How many undertakings would pause before extending a gas main half-a-mile to supply a new power consumer; and, alas, how many will actually lose gas consumption through being unwilling to take a reasonable risk, though the consumer is connected to existing mains? Substantial increases in the consumption of gas have been common during the last eighteen months, but the figures would have been much larger if there had been much more enterprise.

I trust that my remarks will prove helpful to the industry, for they are based upon a strong determination to demonstrate to the public that we are resolved that gas shall continue to hold, as it has done in the past, the "Blue Riband" for public service.

Mr. GEE moved a vote of thanks to Mr. Clark for his virile and outspoken address, and this was seconded by Mr. TOOBY, and supported by Mr. THOMAS and Mr. ROGERS. The last-named warmly congratulated Mr. Clark upon having reached the position of President, and wished him a successful year of office. Regarding such fittings as those referred to by Mr. Clark, he pointed out that the fault was not always that of the manufacturers. He was afraid a great deal of trouble was due to the fact that buyers purchased the cheaper type of appliances. Occasionally they came across cases which showed that if there had been a little co-operation between the manufacturer and those who were going to fit and maintain the appliances, a great improvement might have been made. They owed a very great deal to the manufacturers for the researches they were continually undertaking in connection with fittings.

The PRESIDENT also voiced the need for more co-operation.

On the suggestion of Mr. RENDLE, who referred to many controversial points raised in the address, it was agreed that at a later stage in the session there should be an open discussion upon it.

Coffee was then served, and by permission of Mr. A. W. Smith (the General Manager of the Birmingham Gas Department) the showrooms at the Council House were opened to the inspection of the members.

SWISS GAS AND WATER ASSOCIATION.

Institution President at the Annual Meeting.—The Annual Dinner and an Excursion.

We are indebted to the "Bulletin Mensuel" of the Swiss Gas and Water Association, and to Dr. Bunte's report of the proceedings in "Das Gas- und Wasserfach," for the following account of the Annual General Meeting, which was held this year at Thun, on Sept. 7.

COMMITTEE'S REPORT FOR THE YEAR.

In the report of the Committee, reference is made to the opening of the second half-century of the Association's existence; last year having marked the jubilee. The new period had begun with a year full of business activity, and was marked by a satisfactory expansion in the consumption of gas, which, they all agreed, was so intimately bound-up with the industrial well-being of the country. Among other technical matters, the Committee had agreed to collaborate with the German Association in their endeavours to work out standard formulæ for long-distance high-pressure gas supply.

The membership of all kinds had increased during the year by 18—to 383—which showed a satisfactory state of affairs. Statistics had shown an increase of practically 8 p.ct. in the gas consumption in 1923 as against 1922.

Details are given of many instances in which the Association were able to be of service to individual members in an advisory and consulting capacity, as to competition with electricity and other rivals, gas prices, works construction, new apparatus both genuine and fraudulent, bye-product recovery and marketing, and many other matters. This is a branch of the Association's activities which is much appreciated. The cordial relations which had continued and developed with the sister Associations of other lands are put on record, and it was mentioned that official representation had been found for the respective meetings during the year at Paris, Amsterdam, Salzburg, and Nürnberg. Special attention is devoted to the cultivation of such relations, as they are found to be of considerable value in their suggestions of, and incitement to, new branches of activity and fresh ideas.

REPORTS OF COMMISSIONS.

Of chief interest among these is that of the Technical Commission. Among other labours in the course of the year, they had devoted a good deal of attention to the findings of various engineers and inventors who had studied the question of electrical heating of retort settings, but they were not yet prepared to report on the matter to the Association. In view of the changed conditions since the war as regards coal supplies, they realized that their recommendations in 1913 as to a standard for gas quality were out of date, and they accordingly submitted to the present meeting a revised standard more in accordance with conditions prevailing to-day. The proposals, which were later adopted by the meeting, may be conveniently set out here:

1. The average gross calorific value, reckoned at 0° C. and 760 mm., should be 5000 calories per cub.m. (560 B.Th.U. per c.ft.), and should remain as nearly as possible constant.
2. The average contents of inerts (carbon dioxide, nitrogen, and oxygen) should not exceed 12 p.ct.
3. The gas should be as far as possible free from ammonia and sulphuretted hydrogen.
4. In cases of dispute, an average of at least four days should be insisted upon.

Other matters discussed by the Commission had included the effect of benzole recovery on mains and services, the working-out of standard guarantees to be required in connection with carbonization plant, and standard colours for the easy recognition of various mains. Further consideration is required before recommendations can be submitted on these subjects.

Information collected as to external corrosion of waste-heat boilers indicates that this can generally be avoided by feeding the boiler and preheater with water at as high a temperature as possible. But then it is not always avoidable, since even economizers through which water passes at 60° to 90° C. show white deposits of ferrosulphate, which give rise to corrosion.

THE MEETING.

An informal assembly of works managers on Sept. 6 preceded the general meeting proper, and an interesting paper on the "Use of Tar for Road Maintenance" was read by Herr A. Schläpfer.

On Sept. 7, the President, Herr F. Escher, of Zürich, was faced with a good assembly of 161 members and nearly 200 guests. In his opening remarks, he referred to the excellent start which had been made with the Association's second half-century, and to the movement which had been made during the last year towards closer relations with the Associations of other countries. To the visitors present from the latter he extended especial welcome. For the first time they included representatives of the Institution of Gas Engineers, in the persons of Mr. J. Ferguson Bell, the President, and Mr. W. T. Dunn, the Secretary. From other lands there were Messieurs Chervet, Platon, and Mougin, of the Société Technique, Herr Rosskothen from Austria, and Prof. Dr. K. Bunte and Herr Jokisch from the German Association. Congratulations having been tendered to a number of members and employees who had completed 25 years in the service of the industry, the Reports of Commissions, already referred to, were discussed. These were followed by the technical papers. To these we may be able to make more detailed reference later, when the full texts appear in the "Bulletin Mensuel."

PROPAGANDA.

Herr Rytz, in a paper on this subject, gave some interesting information with regard to the position of the industry in Switzerland. Propaganda is being keenly pursued as in other countries, but must in many respects follow lines of its own there. The efficient utilization of water power is economically of such importance to Switzerland, that the use of electricity for many purposes is inevitable. Of late, the people are awakening more and more to a realization of this, so that opposition propaganda would meet with nothing but resentment. It is, however, all the more necessary to give prominence to the economic importance of gas also to the country, especially in respect of coke, tar, and ammonia as home products. Street lighting declined from 10 million cub.m. in 1914 to 2·5 millions in 1918, and, with the cheap production of current that is possible, a recovery of the lighting load appears hopeless. But, in heating and cooking, the gas industry still feels capable of competing with even the cheapened electricity supply. Caricatures and household pictures are considered ineffective in general, and merely bore the public. Clear expositions of the value and the uses of gas for heating purposes are recommended as being the best propaganda, but recognition must be given to electricity in certain directions in which, in the particular circumstances of the country, it must be acknowledged to have advantages. School children should as far as possible be educated up to the uses of gas, and have any new developments put clearly before them. Above all, architects and builders must be kept up to the mark; but here again care must be taken, having regard to the public sensitiveness in connection with electricity. In the opinion of the

writer, the two industries could work together to a very large extent to their mutual advantage.

Dry Quenching of Coke.

In dealing with this subject, Dr. Escher reviewed the development of the process, and dealt especially with its connection with waste-heat utilization. He pointed out that as recently as 1912 Göhrum, in a technical paper, had shown that the latter was not a commercial proposition; yet developments since then had been so rapid that waste-heat boilers are in almost universal use, or at least always receive consideration. By their use, 50 p.ct. of the heat of the waste gases is recovered. In the modern dry-quenching process, 75 p.ct. of the heat of the coke is recovered, and 380 to 400 kilos. of steam per metric ton of coke [about 840 to 880 lbs. per ton]. Various modern plants were illustrated, showing developments up to date. Working diagrams were given illustrating the dependence of the steam production upon the number of fan revolutions, by which it can be to a large extent regulated to requirements. There can be no question about the advantage of having dry coke for sale.

Annual Dinner.

The official banquet of the Swiss Association of Gas and Water Engineers took place in the Salon des Fêtes at the Hotel Thunerhof, Thun, on Sunday evening, Sept. 7.

It was presided over by Mr. F. Escher, the President of the Association; and the company numbered upwards of 200, including many ladies. As is usual at Continental gatherings of this nature, gaiety was the keynote of the tune, kept in perfect harmony until the early hours of the following morning—the concluding feature being an impromptu dance in the adjoining ballroom. The hotel is celebrated for its comfortable and artistic appointments, and consequently the *tout ensemble* contributed to make the gathering enjoyable in every particular. Not the least pleasing feature of the evening was the beautiful unaccompanied singing of a local choral party of men's voices drawn from the employees of the local industries—gas, electricity, pottery, &c.

The Secretary of the Association, M. H. Zollikofer, of Zurich, is certainly to be congratulated on all the arrangements made, in the organizing and carrying out of which he was most ably assisted by M. Rytz, the Engineer of the gas undertaking at Thun.

Among the notable guests present at the banquet were Mr. J. Ferguson Bell, M.Inst.C.E., President of the Institution of Gas Engineers, and the Secretary, Mr. Walter Dunn, M.I.Mech.E. Both gladly availed themselves of the opportunity of renewing acquaintances made during the Institution's visit to Paris in the previous June, when members were the guests of the Société Technique de l'Industrie du Gaz en France at the Society's Jubilee celebration. Dr. Bunte, of Karlsruhe, Herr Lux, of Ludwigshaven, and M. Mougin, Secretary of the French Society, were to be seen. There were official representatives also from France, Austria, Germany, and Italy. The principal local guest honoured was M. Schmid, who is a member of the Swiss legislature, and occupies an important position in the technical department of the town council of Thun.

M. Schmid in his speech welcomed the visitors to his town, and expressed the great pleasure his fellow-townsmen and himself felt in seeing so many present.

The toast of "The Visitors" fell to the lot of M. Desgouttes, Vice-President of the Association, and he accomplished his duty in an admirable manner. His grace of diction, in the French language, enabled him to dilate on his theme in most eloquent terms, greatly to the gratification of all his hearers.

M. Dubs, of the Swiss Society of Engineers and Architects, was the first to respond. He enlarged on the advantages of such international assemblies in promoting a common brotherhood, and the peace of the nations of the world. He sincerely trusted these gatherings would be continued and multiplied.

Germany's representative, Herr Jokische, who followed, assured the Association of the high appreciation of the honour done to his country in being invited to participate in the proceedings. The cordial welcome he and his colleagues had received from their hosts and fellow guests bore testimony to the general desire to foster friendship; and this was of very material importance at the present time to the happiness and prosperity of the peoples of every country.

Mr. Bell spoke on behalf of Britain, and was particularly apt in his observations, which were enthusiastically received. He referred to the part which Switzerland had played in the scientific work of the world; her railway engineering achievements, arrived at after negotiating almost insuperable natural difficulties, were the admiration of everybody. Her remarkable development of hydro-electric traction had made considerable strides during the past few years; and it was probable that within the near future all the country's railways would be electrified. On the main lines electric locomotives of 2000 h.p. were installed, two of which were required in ascending the gradients and curves. Speaking of the gas industry, he paid a tribute of praise to those engaged in it; for, notwithstanding the necessity of importing coal, and the employment of "white coal," gas was holding its own. Swiss gas engineers, by their ability and persistence in the face of disheartening obstacles, had done splendidly. The price of gas was now also in a downward direction. After reference to the excellent educational advantages available, Mr. Bell concluded with some observations on the scenic beauties of Switzerland. They were at the gate of the Bernese Oberland, famed as offering one of the choicest examples of mountain, valley, lake, and river scenery to be seen in any part of the world.

The President, Dr. Escher, having expressed on behalf of the Association the gratification which was felt in welcoming their friends to Thun, made various announcements in regard to the excursion on the following day. The banquet then dissolved into a conversazione and dance, which were greatly enjoyed.

Excursion to Lake Oeschinen.

Leaving Thun by railway at about 9.30 a.m., the party duly arrived at Kandersteg in the Bernese Oberland, after an hour's journey through typical mountain scenery. Then commenced an enjoyable, if strenuous, mountain climb to an elevation of some 4000 ft. At the summit is situated a comfortable and picturesque hotel and outdoor restaurant, which overlooks the lake. Here was in readiness an excellent and generous hot luncheon, to which, needless to say, every amateur Alpinist did full justice. There were Bernese Oberland musicians in native attire to accompany the novel repast; and even a real avalanche occurred, as if it had been timed to perfect the picture for the enjoyment of the Swiss Association and their guests.

In the afternoon there were various "*divertissements aux environs du lac.*" These were fully appreciated, the British representatives taking their full share in all that was going on for the general delectation of the company.

Then came the descent to Kandersteg. Here time was available for a walk in the charming village, and tea. At six o'clock the train left for the return to Thun; there were regretful farewells; declarations of reunions next year at the gathering at Lugano, if not before; and the Association's annual assembly of 1924 had passed into history.

SCOTTISH JUNIOR GAS ASSOCIATION

(WESTERN DISTRICT.)

On Saturday afternoon, Oct. 25, about 100 members visited the new electric power station of the Glasgow Corporation, at Dalmarnock. The members were received by the Works Manager and his assistants, and after being formed into small parties were shown round the works.

The Dalmarnock power station, which is still under construction, will cover an area of 13½ acres, and has a most advantageous site, being bounded on one side by the River Clyde, from which the water supply is drawn for the condensers. Much interest was evinced in the method adopted for taking in the water supply, which embodies revolving filter screens, for eliminating leaves, sticks, and other débris. After use the water is returned to the river. The original plans were for steel buildings, but these had to be discarded during the war, and reinforced concrete substituted.

The coal-handling plant is capable of dealing with 100 tons per hour, and the coal store accommodates 75,000 tons. Each boiler room contains eight Babcock & Wilcox water-tube boilers generating steam at 275 lbs. pressure per sq. in. at 700° Fahr. The turbine house is equipped with a 75-ton electric crane, so that heavy parts can be moved with comparative ease. The house contains five turbines, each with a capacity of 18,750 kw. Condensers are fitted to each turbine; and the pumps are capable of passing 22,500 gallons of water per minute.

The members were much impressed by the magnitude of the works; and on the completion of their tour, Mr. M'Isaac, the President, cordially thanked Mr. Irons and his assistants for their courtesy and for the privilege of visiting their works.

The next meeting of the Association, on Nov. 8, will be a joint one with the Eastern District, at Edinburgh. A visit will be made to the Granton Works, after which Mr. John Young, B.Sc., will read a paper on "Recording Calorimeters." Principal Laurie, of the Heriot Watt College, will also give a short address.

Relative Value of Mixed Gas and Coal.

In a report by Mr. J. E. Kinner, Heating Engineer, of Cleveland, to the American Society of Heating and Ventilating Engineers, he cites conditions in Buffalo, where a mixed gas—manufactured and natural—carrying a heat value of not less than 800 B.Th.U per c.ft., costs 60 c. per 1000 c.ft. Comparing this with coal, he explains that 1 lb. of the average coal contains about 12,000 B.Th.U. Compared with 800 heat units in a cubic foot of gas, 1 lb. of coal is equivalent to 15 c.ft. of gas, and 1 ton of coal would be equivalent to 30,000 c.ft. of gas at 60 c. per 1000 c.ft., or $18. In other words, 800 B.Th.U. gas at 60 c. per 1000 c.ft. is equivalent to coal at $18 per ton. Laboratory tests show that a high-grade appliance designed and built for the use of gas as a fuel, and to be employed in connection with a central fired heating plant, develops an efficiency of from 80 to 85 p.ct., and that the average coal-fired house heating apparatus used in connection with a central fired heating system has an efficiency of from 50 to 60 p.ct.

LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.

Opening Meeting of the New Session.

The Opening Meeting of the new session of the Association took place last Friday evening at the Westminster Technical Institute, S.W., when the new President, Mr. W. NEWTON BOOTH, B.Sc., Assoc.M.Inst.C.E., of Woolwich Arsenal, delivered his address before a large attendance of members.

Mr. WALTER GROGONO (the outgoing President), who occupied the chair at the commencement of the proceedings, said he had an extremely pleasant duty to perform in asking Mr. Newton Booth to take the reins. He did not think anyone could have been chosen for the Presidency who would have better occupied the position, and felt confident that they were going to have a very successful year. The members knew all his qualities, and the Council were to be congratulated on their selection.

Mr. W. NEWTON BOOTH, who was cordially received on taking the chair, thanked Mr. Grogono for his kind words, and the members for their warm reception. He then delivered the following

PRESIDENTIAL ADDRESS.

My first duty must be to express the deep sense of the honour you have conferred upon me in electing me your President for the ensuing year, and to thank you for this honour.

The London Association is the largest of the British Junior Gas Associations; and the fact that the majority of its members are drawn from the staffs of the large gas companies supplying the Metropolis gives it a unique constitution, and renders difficult the President's task of giving an address which shall cover a sufficiently wide field to interest, at any rate in part, gentlemen engaged on widely differing phases of the gas industry, and yet reach the high standard associated with this body.

I do not propose to give you details of the works on which I am engaged, as I hope to be able to see you there later in the session, and you will then gather a much better idea of them than could possibly be given in an address like this. Remembering therefore that I am addressing an Association of the junior members of the gas industry in London, all of whom presumably are ambitious and desirous of obtaining promotion therein, I thought a few words on the way in which junior associations can help the members would not be out of place.

In our rules we read that the objects of the Association are to extend the technical knowledge and promote the general welfare of its members, and that members are confined to certain classes of the employees of gas and similar undertakings. The gathering together into Associations of men engaged in the same craft or trade, for the purposes of mutual benefit and support, dates from very ancient times. We read that Tubal Cain was an instructor of every artificer in metals; and the existence of guilds of masons, metal workers, and similar crafts in the empires of the ancient world is a matter of history, and such guilds had important privileges and responsibilities. In our own country in mediæval times the power of the craft guilds was very considerable; and relics of these remain in the various companies and guilds in existence. We all know what beneficial effect these have had in promoting and encouraging technical education through the City and Guilds of London Institute and the various schools of other guilds. From such associations we have received a most inspiring heritage and tradition; and it is our privilege to do our part in handing it on to posterity shining with increased lustre.

It is only fair, however, to point out that conditions have changed considerably since the palmy days of the old crafts guilds. The feudal system under which they grew and flourished was gradually replaced by the industrial system; and, at any rate at first, the responsibilities attaching to the feudal lords of early times for the security and general well-being of the working classes were not assumed by the class which replaced these lords under the industrial system, while all the privileges were retained as strongly as ever. It can readily be seen that such conditions could—and they actually did—result in a great deal of oppression of the workers by the employing class. This naturally led to discontent; and in order to deal effectively (as they thought) with a growing tendency to the formation of combinations among the workers for the purpose of obtaining redress of grievances, Parliament in 1799 passed an Act definitely making all such combinations illegal. Such an association as ours would therefore have been impossible less than 125 years ago.

Such political conditions, far from disposing of the trouble, actually accentuated it; and a somewhat stormy period followed. Combinations of workers were re-organized, and there was much wild talk of the power of organized labour. General strikes were threatened, but the organization was insufficiently good, and the attempt failed badly. The passing, in 1865, of the Master and Servants Act, which made a servant liable to three months' imprisonment for breach of contract, did not tend to allay the discontent; and it was not until 1871 that combinations of workers were recognized and legalized by the passing of the Trades Union Act; and in 1875 their powers were increased by the legalizing of picketing in trade disputes.

The power of employees to combine for their own benefit and in supposed opposition to the interests of the employers had been stayed for three-quarters of a century, but at what a price. The definite idea that the interests of employers and employed in industry are separate and distinct, and that the two interests are diametrically opposed, was born and nurtured, together with the impressing upon the workers the idea that in order to secure their rights and interests in industrial matters it was necessary to combine to take political action. It is to the lasting credit of a great member of the gas industry that in this difficult time he had the clarity of vision to see that workers' and employers' interests were not opposed, indeed were very largely identical, and that he commended the system of co-partnership, the success and stability of which have shown on what sure foundations he builded.

It is largely as a result of the times I have referred to that one hears to-day a very great deal of the "rights" of the workers; and while I should be the last to belittle those rights, we must remember that rights carry corresponding responsibilities, and that these are insisted on to a much smaller degree. An old chief of mine used to illustrate what he termed the right and wrong way of building-up an organization, by drawing an erect and an inverted pyramid. Of the latter very little need be said, as the mistake is self evident. Not only is the whole structure in an extremely unstable position, but as soon as it exceeds a certain and very limited size, the head is crushed by the load of responsibility it attempts to carry. Organizations on this principle are "one man shows." Of the other method a pyramid is typical in many ways. In the first place the head is relieved of any crushing load. The apex merely sets the main lines on which the whole structure is built. Again, any horizontal section of the pyramid has above it a complete pyramid similar in all respects, and this condition obtains however much the pyramid is extended. Such a structure is always complete and stable, however great its size, as it has a broad base capable of supporting it. You may ask how does this apply to our subject. The reply is that such a pyramid is typical of a successful method of building any organization, be it bank, gas industry, or our own Association; and the members of, and workers in, the concern are the stones from which the whole structure is built. Let us examine the method of building. The whole structure is founded on and supported by the lowest layer. I think this is a thought which should hearten the juniors. They form the most important part of the structure, and without this support it must surely fall. Defects and lack of strength in this portion have a much greater detrimental effect than higher up.

As already mentioned, the chief or corner stone at the top is necessary to complete the pyramid; and it is upon its lines and shape that those of the whole structure depend. But this address is to juniors, so we need not concern ourselves further with the functions of the chief, save to point out that as we come upwards in the structure the stones must approximate more and more closely to the main lines of the whole. Many other analogies could be given; but sufficient has, I think, been said to impress upon you the fundamental importance of the younger or junior members. I should like this to be taken to heart. Our younger members should take an active part in the work of the Association, and not be afraid that any contribution they can make to our papers and discussions is too small to be important. They should remember they are working on the lower fringe, and consequently come into closer touch with the foundations. They thereby get a much closer view of the ultimate detail on which we rely for success than those higher up, and should take advantage of their opportunities to obtain accurate and comprehensive knowledge of these, and to pass such knowledge on. Nothing is too small to notice; and it is often some small detail which makes all the difference between success and failure.

There is one aspect of organization which our symbol of an inert pyramid fails to represent. The organization must be alive and growing, otherwise it will wither to decay. This means constant change, the replacing of worn-out cells with others better fitted for the fray, and a quiet growth of the whole both in size and complexity. It is difficult to find a suitable analogy for this, as the mechanism of similar processes going on in nature is usually too microscopic to allow us to picture it easily. As in a plant, however, the sap—the life blood of the organization—comes from below and gradually works its way up. Old cells decay and are cast off, and new cells take their places, in a somewhat similar way to that in which the members of an organization disappear and are replaced by promotion; and the process should go on almost imperceptibly and with as little dislocation in the one case as the other. As individuals or cells, how is this to be accomplished? I should like to suggest that there are two essential conditions to be fulfilled by the individual, and that it is his own responsibility very largely to see that these are actually fulfilled. These are very simple. First, the individual must be fitted to fill the position above him in the organization, and, secondly, he must be able to be spared from his existing position—*i.e.*, there must be someone else capable of filling his present post. There is a tendency among men of a certain temperament deliberately to avoid fulfilling the second condition, as the common phrase goes "to make themselves indispensable." I would point out that this is a short-sighted policy, as not only does it place a very distinct difficulty in the way of his promotion, but an enlightened chief would certainly consider whether he could continue to employ an individual who was a block in the way of regular promotion. One should remember in this connection that no man is really indispensable, and the organization would go on if he died suddenly.

To the juniors, then, I would say: Lose no opportunity of gaining the knowledge and experience necessary to fit you for your senior's position, and as far as possible know his job as well as

he does; but above all pass your knowledge on to your subordinates and give them an opportunity to know your job. Far from losing anything in this way you will actually be the gainer; not only will your own knowledge grow broader and deeper in the process, as the very act of passing on information demands clear expression and still clearer thinking, but opportunities will occur for delegating at any rate the less important portions of your work, and leave you time for investigating improved methods of doing it.

To carry out such ideas demands a constant acquisition of new experience and knowledge. The Junior Gas Associations have assisted in no small degree in the drawing-up of the Institution of Gas Engineers Education Scheme which has been adopted by the Board of Education; and classes in connection with this scheme are now being held in various centres. The scheme provides for comprehensive courses of training, from the elementary stages of gas manufacture and supply up to the full diploma course qualifying the holder for the highest class of technical administration. A very important feature is that the courses comprise classes in the ancillary scientific subjects which are necessary for the proper understanding of the main subject matter, and thus place the students' training on a much wider and safer basis than most of the organized courses hitherto available. Our younger members will find these courses an invaluable aid to increasing their store of knowledge of the processes and methods in common use, and a basis on which to build further work.

The proceedings of this Association afford further opportunity—of which I hope full advantage will be taken—for disseminating knowledge acquired by any member, and of exchanging views on the same in the papers and discussions which take place. In the programme which has been arranged for the coming session your Council have endeavoured to obtain papers and lectures covering as wide a ground as possible, so as to be of use and interest to the largest portion of our members. We are also extremely fortunate in the interest taken in us by the many undertakings who welcome us to visit their works. These visits give an opportunity of widening our experience and of seeing fresh ideas put into every-day practice, and thus help very materially in the dissemination of new knowledge. It is almost impossible to visit a works without coming across something which has a direct application to one's every-day practice.

So far this address has been of a very general application, but one must not forget this is an age of specialization. Indeed, it must be so in the case of large organizations; and the peculiar conditions of the gas industry in our district, in which the supply is in the hands of a comparatively few large undertakings—a condition which is being enhanced by further projected amalgamations—make ours an association of specialists, who are concerned almost exclusively with but one department of the industry. To those whose concern it is to manufacture the gas or to distribute it in sufficient quantity to the consumers, I would point out that the processes and methods in present use have been evolved slowly and perhaps painfully during rather more than a century; but in all essential particulars the processes are still practically the same as were evolved in the very earliest days, and the improvements which have been made consist in better engineered plant allowing of the more efficient carrying-out of the process. The present financial success of the gas industry depends upon a somewhat intricate balance of the market values of coal and the various residual products obtained in the process; and it cannot be contended either that finality has been reached in present processes and methods of carrying them out or that the present processes are ideal. The chemist and physicist are adding greatly to our knowledge of the behaviour of materials under physical conditions of temperature and pressure different from those in common use but which it is not beyond the skill of engineers to realize upon a manufacturing scale, as has already been done in connection with the Haber and Claude processes of nitrogen fixation; and it is well within the bounds of probability that our present methods of manufacture and purification may be revolutionized thereby, and the dream of a day of universal gaseous, or at any rate smokeless, fuel become a reality. The gas industry has already done much, and will do a great deal more, to bring about such a state of things.

It will not be given to all to effect great changes. Pioneers are ever lonely and few. The rank and file, however, are engaged in getting the best out of existing plant and processes. To those I say, be always out for improvement. That a process has been a success for a long time is no reason for considering it satisfactory; in fact there is every reason to suppose that it has lagged behind the general run of improvement. Examine all your processes, comparing each one with theoretical perfection, and seeing how far it falls short of 100 p.ct. For example, the heating efficiency of an average horizontal retort setting consuming (say) 2½ cwt. of coke per ton of coal carbonized is under 25 p.ct. Can one not get out after a bit of the 75 p ct., which has a distinct money value? The problem is receiving attention in many quarters now. When satisfied on this point, details may be studied. It is much easier to lop off lumps with an axe than to reduce roughnesses by means of sandpaper; but the latter method leaves the best job, and discretion is required as to which tool is the best in any case. In all this the guiding factor should be that of final cost of product. As a Yorkshire friend put it to me, "a plant should be 'brass-tight' as well as gas-tight"—indicating the advisability of searching for and stopping all small losses which cost money.

Those chiefly employed in the gas sales or fittings departments should not forget that first they are the representatives of the gas industry who come into intimate contact with the consumer, and that the industry is apt to be judged by them—a further instance of the importance of the lower layer of the organization. What our customers require is service; and it matters little to them what technical basis we employ for charging for the product so long as they can understand it. What does matter is the cost of the service—how much has to be paid for a hot bath or for an industrial process.

In certain directions, principally those concerned with the usual domestic operations of lighting, cooking, heating, and water heating, the apparatus marketed by the best makers, while still capable of small improvements, is fairly efficient, and can be offered with confidence as providing service by means of gas at economical rates; but in the field of industrial heating, in which the possibility of the extended use of gas is very great, much remains to be accomplished before we can rest satisfied that the best possible has been done. This is a field in which there is room for much research and for close co-operation between the industry and the consumers. Before leaving this question I would like to direct your attention to the important research work on industrial problems being carried out under the ægis of the Department of Industrial and Scientific Research and the various Research Committees of the Institution of Gas Engineers. These seem likely to lead to results of considerable economic importance and well repay careful study.

To return to our own Association, the following summing-up of my ideas for making it of the greatest possible use to all the members may be remembered better than the somewhat discursive address you have listened to. Let every member play the "team" game at the expense even of a little personal sacrifice, supporting the rest of the members to the best of his ability, and disseminating for the general good all information he may possess relating to the subjects under discussion, realizing that it is just as important for him to fill his place as it is for the lecturer to attend. I would also leave with you the idea that the gas industry has a glorious future. This future and the reaping of the harvest thereof is in the hands of the men who are now Juniors. Go in and reap, and good luck attend you. Shoulder your responsibilities, and you will have good reason to receive your "rights."

VOTE OF THANKS.

Mr. W. L. WESTBROOK (North Middlesex Gas Company), in moving a vote of thanks to the President, said the address had been well thought out, and contained a large amount of sound advice. The call that had been made to individual members to back-up the Association would, he hoped, meet with a good response. It was, as the President had said, only by team work that they could expect to get the best results out of the Association. He drew attention to the comparatively small proportion of the total membership over which the contributions to the various discussions were spread, and urged that a greater number of members should make up their minds to take part in the debates.

Mr. A. BROADBENT (Gas Light and Coke Company) seconded the vote. They would, he felt certain, all derive benefit in the present, and encouragement for the future, from a careful perusal of the address. It was a really inspiring one.

The PRESIDENT briefly acknowledged the vote, after it had been heartily carried.

A PRESENTATION.

The PRESIDENT said he had now to express to Mr. Grogono the warm thanks of the members, and their deep sense of gratitude, for the services which he had rendered to the Association as President during the past session, and to make a small presentation to him in token thereof. The past year had been one of the record ones of the Association, which was certainly never before so strong or in such a position of influence among the Juniors of the country. Much of this was due to the untiring efforts of Mr. Grogono on behalf of the Association. He therefore asked him to accept a framed illuminated address, and expressed the hope that it would serve to remind him of the happy days which the members at any rate passed under his presidency.

Mr. GROGONO, in acknowledgment, said he did not need a gift like this for anything he had done, for he had really enjoyed himself very much indeed. It was only by the aid so freely given by the Secretary and the Council that the President found himself able to accomplish anything at all.

The PRESIDENT again strongly appealed to the younger members to take a more active part in the proceedings at the technical meetings.

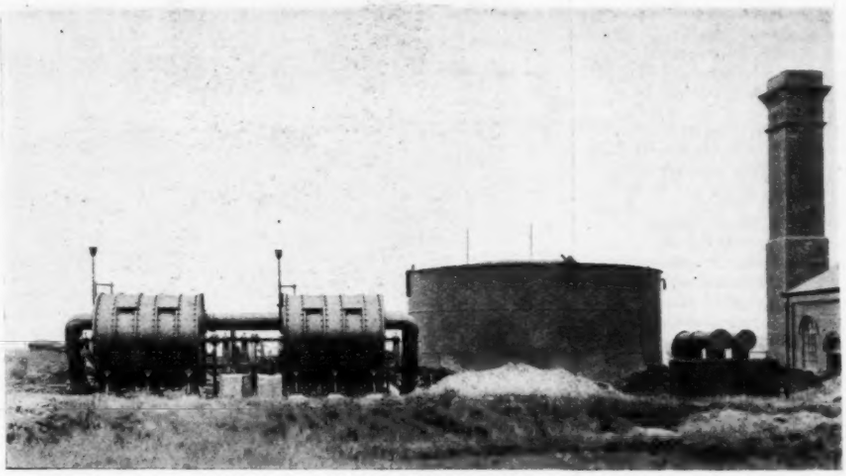
During the evening the names were announced of about a dozen new members and associate members; and at the close of the business, some time was spent over light refreshments and pleasant conversation.

Will.—Mr. Hornsby Jackson, who was Chairman of the Calverley and Horsforth Gas Company, left estate of the gross value of £3301, with net personalty £3205.

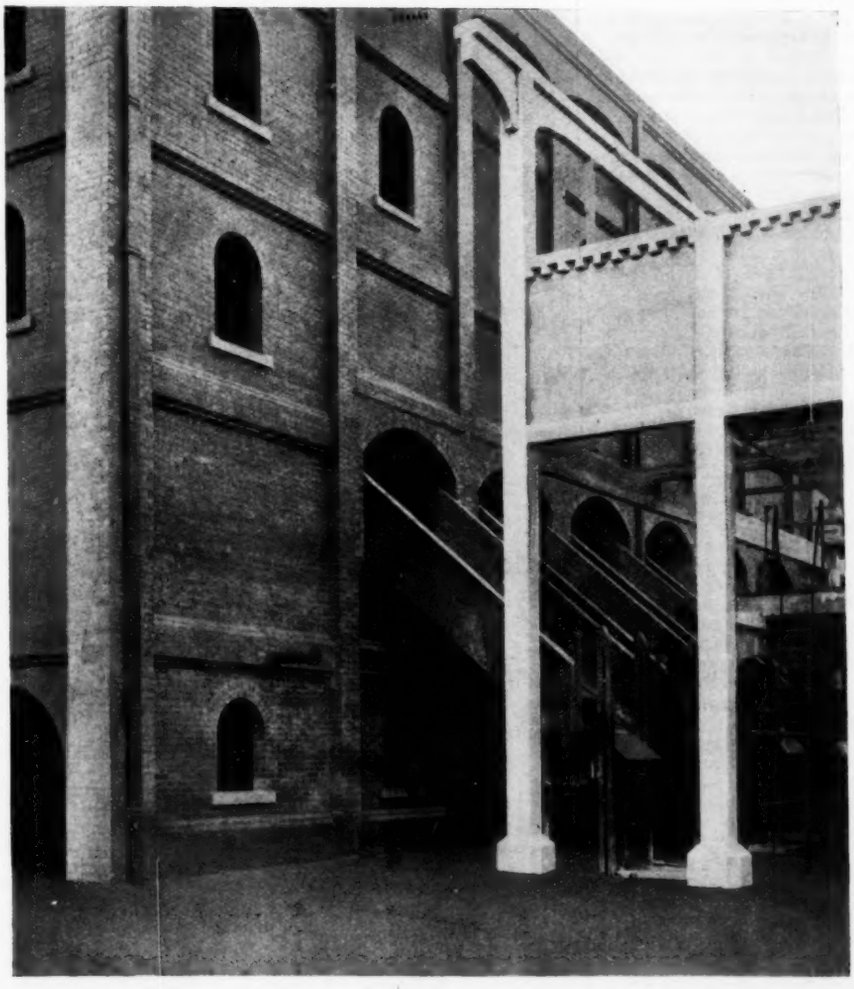
London and Southern District Junior Gas Association.—On Saturday, Nov. 15, the Association will visit the Willoughby Lane Works of the Tottenham District Light, Heat, and Power Company. Members should assemble at the entrance to the works at 2.30 p.m. On Friday, Nov. 20, at 7.30 p.m., a meeting will be held at the Westminster Technical Institute, Vincent Square, S.W. 1, when a lecture on "Gas Cooking" will be given by Dr. H. Hartley, Chief Chemist to Radiation Limited.

THE NEW WORKS FOR LYTHAM ST. ANNES.

AT Eastham, a fortnight ago, there were opened new gas-works for the Borough of Lytham St. Annes. A full report of the inaugural proceedings, together with a description of the new and the two older stations of the undertaking, appeared in last week's "JOURNAL," pp. 289-92. By the courtesy of the Engineer, Mr. J. H. Ranft, and the Contractors, we are able this week to supplement our report by the selected photographs on this and the two following pages.



WASHER-SCRUBBER, WORKS GASHOLDER, AND LIVESEY WASHER.—MESSRS. R. & J. DEMPSTER.



COKE QUENCHING BENCHES AND STORAGE HOPPERS.—AN INSTALLATION BY MESSRS. DRAKES.

THE ARLEY SEAM OF THE LANCASHIRE COALFIELD.*

Investigation by the Fuel Research Board.

Research on the Arley seam was undertaken on account of the important position which this seam occupies in the Lancashire coalfield. It was felt desirable that the first examination should be of a widely-used coal, which could be recognized over a large area; and these conditions were fulfilled in the Arley seam. Moreover, its well-marked characteristics and consistency render it valuable as a geological horizon. Though the seam has been extensively worked, it is by no means exhausted, and this applies especially to the deeper parts of the coalfield. Further, it was decided that it would be advisable to deal with this coal from as many aspects as possible, as an aid to the study of further seams.

CHARACTERISTICS OF THE SEAM.

The Arley seam maintains an average thickness of 3 to 4 ft. over wide areas. It is a bituminous, strongly caking coal, and is largely employed both for gas making and in the manufacture of coke. For the preparation of metallurgical coke it is often best blended. It is also used for steam raising, manufacturing, and household purposes. The Arley seam is frequently sold blended with other seams. The consistency of the seam throughout the greater part of the coalfield over which it has been proved to exist is shown by the analyses. It would appear that the percentage of volatile matter in the coal substance is highest in the top sections, decreases towards the centre of the seam, and increases again at the bottom. This trend is also generally observable in the ash content. There are only small variations in the ultimate analyses of samples from different localities over a large area.

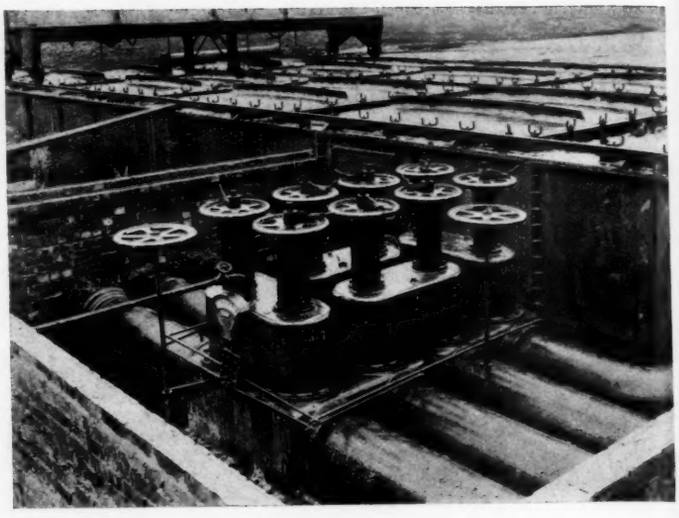
The ash of Arley coal from different localities has been found to vary in its composition and fusibility; and the seam contains white inorganic partings (or ankerites), but the proportion present is somewhat lower than in most of the Lancashire coals. The material is a substituted calcium carbonate containing magnesium, iron, and manganese. Though composed mainly of clarain with varying amounts of vitrain, the seam frequently contains thin bands of dull coal (bones or bone coal). These bone bands are shown, however, not to be an impure material, but to consist of durain, which is a normal constituent of most coals. Fusain occurs in the Arley seam to the extent of about 1·5 p.ct. of the total coal. This amount is somewhat less than in many other Lancashire coals, but, in composition, the fusain is similar to that derived from other seams.

LOW-TEMPERATURE CARBONIZATION OF ARLEY COAL.

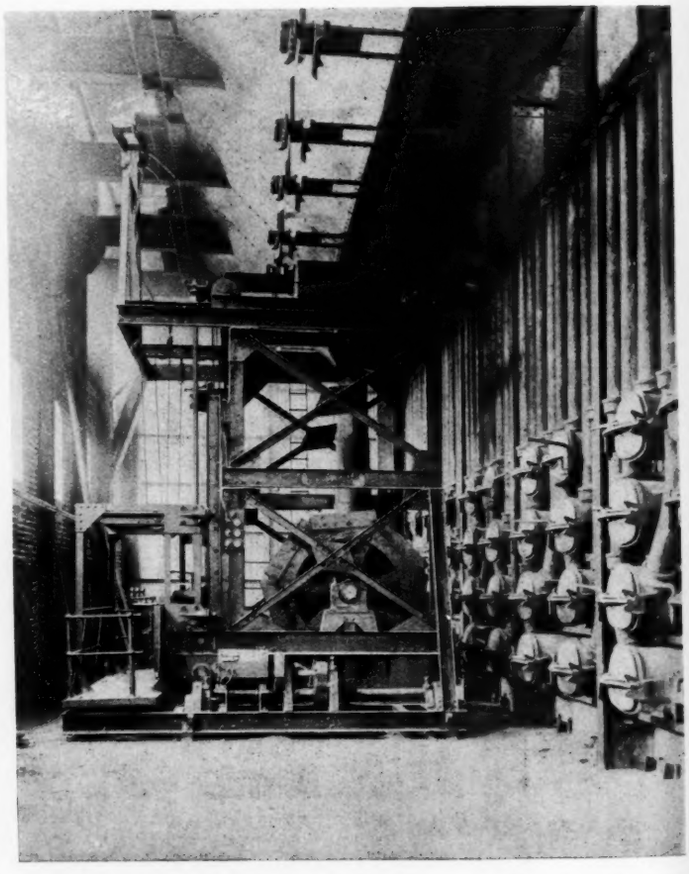
The behaviour of the coal during carbonization in the laboratory assay apparatus at a temperature of 600° C. has been studied, and much useful information obtained in regard to the general properties of the coal and the yields and qualities of the products. In the first experiments, "run-of-mine" samples of the Arley seam, from three different localities situated over a wide area, were investigated; and though the actual yields of tar, gas, &c., in each case were very similar, the character of the resultant cokes was surprisingly different. The coke obtained in both cases from the Bryn and Burnley samples showed no swelling, and was very firm and hard, while that from the Standish sample was very much swollen and porous. A detailed examination of the constituent parts of a complete section of the seam from a fourth locality—Atherton—brought out the interesting fact that, while the sample

* Fuel Research Board. "Physical and Chemical Survey of the National Coal Resources. No. 3." H.M. Stationery Office, Adastral House, Kingsway, W.C. 2. Price, 2s. 6d. net.

NEW WORKS AT

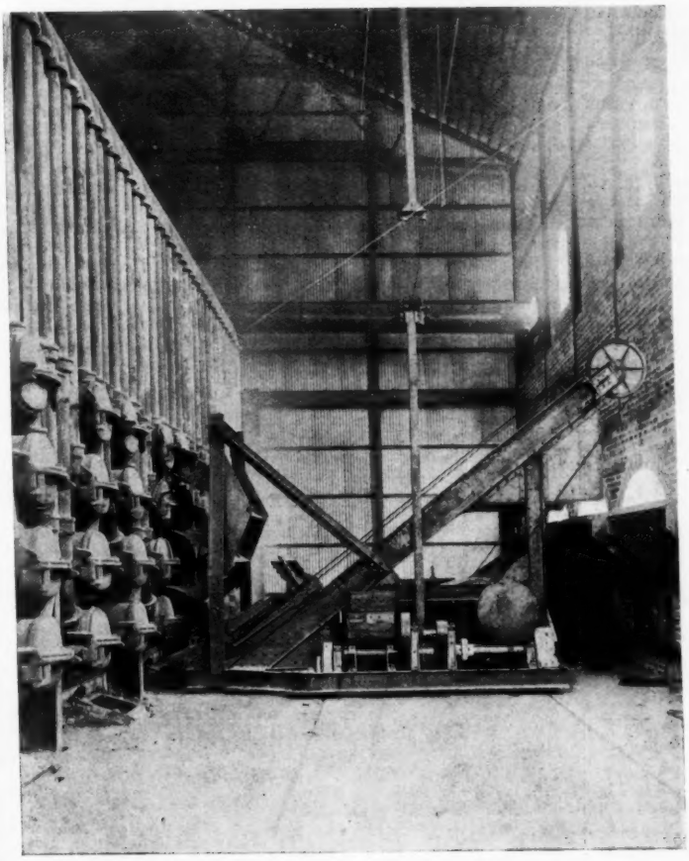


THE "BEARSCOT" CENTRE VALVE WITH REVOLVING DISCS.—MESSRS. R. & J. DEMPSTER.

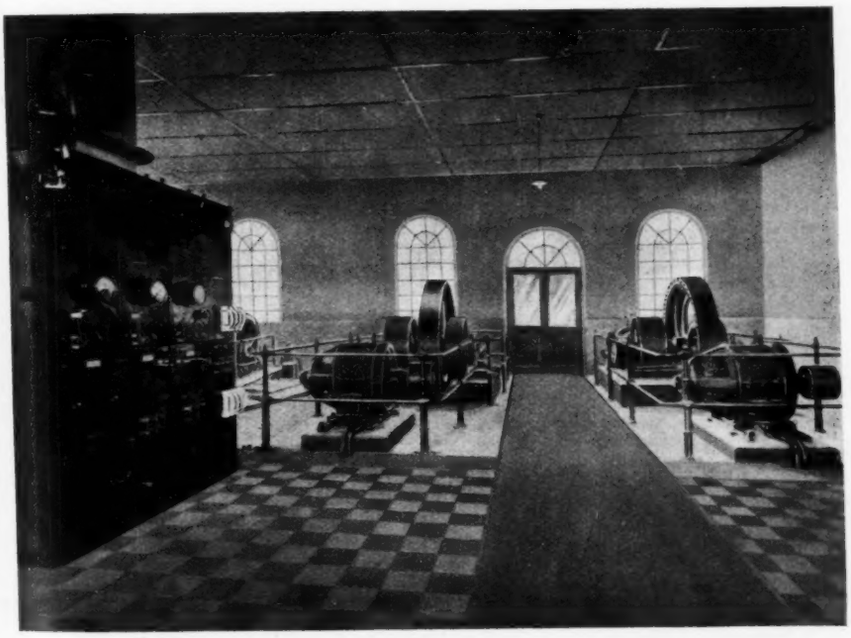


DRAKES' COMBINED CHARGER-DISCHARGER.—THE VIEW SHOWS THE COAL BUNKERS.

LYTHAM ST. ANNES.



DRAKES' COKE TRANSPORTER.



POWER HOUSE.—ENGINES BY THE NATIONAL GAS ENGINE COMPANY, LTD.

All electrical equipment was supplied by the British Thomson-Houston Company, Ltd.

representing the average composition of the whole seam gave a swollen but strong coke, which was very similar to that from the Standish sample, the samples from two separate horizons in the seam both gave hard and compact cokes with no swelling and no visible signs of foaming; these two cokes were similar to those obtained from the Bryn and Burnley samples.

Carbonizing tests at 600° C. have also been carried out at H.M. Fuel Research Station in the setting of mild-steel horizontal retorts specially designed for experimental work on low-temperature carbonization. In these tests approximately 100 lbs. of each of the coals mentioned were used. The results obtained were in agreement with what might have been forecasted from those of the laboratory assay.

STEAMING TESTS.

A series of tests on the steaming of Arley coal was carried out at H.M. Fuel Research Station in the setting of Glover-West vertical retorts on 400 tons of coal specially supplied for this purpose. The full account of these experiments and the results obtained have been published in a separate paper [see "JOURNAL" for Nov. 7, 1923, p. 378], but the main details of the several tests are set out in this report. The coal proved to work well in the retorts so far as handling and carbonization were concerned, though at higher percentages of steam the temperatures in the upper part of the retorts tended to become high. This had a bad effect on the yield of ammonia. The amount of heat required per ton, including the sensible heat in the products, varied from 13 therms with 5 p.ct. of steam to 18·25 therms with 20 p.ct. of steam. The general effect of steaming on carbonization yields for increases from 5 to 20 p.ct. of steam are summarized.

Experiments made in regard to the liability of Arley coal to undergo spontaneous heating under certain standardized conditions showed that the coal exhibited the glow point (commencement of visible active combustion in an atmosphere of oxygen) at a lower temperature than any of the other Lancashire coals examined.

A complete microscopical examination, layer by layer from floor to roof, of the Arley seam from two different localities—Ashton-in-Makerfield and Burnley—was made. It showed that the proportions of the various kinds of vegetable constituents deposited were such that there was not a preponderance of any one class of constituent. This may account for the general properties of the Arley coal, and for its consistency throughout the greater part of the coalfield.

GENERAL CRITICISM OF THE SEAM.

The results of the investigation indicate that the Arley seam, which is used for coal-gas making, steam raising, manufacturing, and household purposes, is especially valuable for gas manufacture. From it metallurgical coke may also be made. They also show that the coal from certain localities is suitable for use by itself for low-temperature carbonization; a strong, hard, compact, smokeless solid fuel being obtained. In the case of the coal from other localities it should, however, be blended with a seam possessing inferior caking properties, in order that the best results may be obtained. The yields of tar, gas, &c., in each case were satisfactory.

The Sale of Goods.—The tenth edition of "The Sale of Goods Act, 1893," by Sir M. D. Chalmers, K.C.B., C.S.I., has just been published by Messrs. Butterworth & Co., Bell Yard, Temple Bar, London. In this edition, the price of which is 15s. net, the notes have been revised, and some new illustrations have been added to the sections of the Act.

MISSING PRESSURE AND HEAT LOSS IN GAS ENGINES.

The Views of Prof. David, M.A., D.Sc., of Leeds University.

At a meeting of the Institution of Mechanical Engineers held last Friday, Prof. W. T. David, M.A., D.Sc., of the University of Leeds, gave an account of experiments made with the object of obtaining a quantitative solution of the problem of the missing pressure in gas engines. In recent years there has been a growing tendency to believe that this is to be accounted for in terms of increasing specific heat of the products of combustion with temperature, and also—to a smaller extent—of heat loss to the cylinder wall. Prof. David's experiments, however, show that, even under the ideal conditions obtainable in a closed vessel, about 10 p.ct. of the gaseous fuel (coal gas) is unburnt at the moment of maximum pressure, and that, therefore, incomplete combustion, in addition to increasing specific heat and heat loss, must be regarded as an important factor in limiting the pressures developed.

INFLUENCE OF INCOMPLETE COMBUSTION.

An examination of the gas-engine experiments of Clerk and Hopkinson (see "JOURNAL" for Sept. 7, 1909, p. 633), in the light of the closed-vessel experiments carried out by Prof. David, shows clearly that incomplete combustion is of even greater importance in limiting the pressures developed in an engine cylinder. About 30 p.ct. of the gaseous fuel appears to be unburnt at the moment indicated by the peak of the indicator diagram when the ignition setting is normal. The explanation of this large amount of unburnt gas at this moment would appear to be that in general the peak of the diagram is reached when the flame has just filled the combustion space, at which moment closed-vessel experiments indicate that about 75 p.ct. of the gaseous fuel has been burnt. During the later stages of inflammation the rate of rise of pressure in a closed vessel is at its maximum value, but during after-burning (which has been defined as the burning which takes place after complete inflammation) the rate of rise of pressure slows down; and it is reasonable to suppose that the rise of pressure due to after-burning which would have taken place had the piston remained stationary at its inner dead centre is masked by the expansion due to the motion which actually occurs.

EFFECT OF AFTER-BURNING.

The experiments described by Prof. David, while they emphasize the importance of incomplete combustion equally with that of increasing specific heat as a factor in limiting the pressures developed, do not indicate that it very greatly affects the thermal efficiency of gas engines working upon strong or moderately strong mixtures, for the bulk of the after-burning is completed in the early stages of the expansion stroke. This being so, after-burning is an advantage, because it reduces the ratio of the maximum pressure to the mean effective pressure—a factor having a special significance in mechanical design. These experiments do not, therefore, call for appreciable amendment of figures given by various investigators for the efficiency ratio (that is, the ratio of the actual indicated thermal efficiency to the ideal), which may approach 90 p.ct. in well-designed engines. Little margin is left, therefore, for improvement as long as the standard cycle of operation is adhered to.

HEAT LOSS IN GAS ENGINES.

The effect upon the thermal efficiency of heat loss from the working fluid of internal-combustion engines to the cylinder walls and piston has frequently been over-rated in the past. It nevertheless exercises an appreciable influence over efficiency, and it is estimated that, were it possible to eliminate it altogether, an engine working on strong mixtures with an actual efficiency of (say) 35 p.ct. would yield an efficiency of about 40 p.ct. It is, however, impossible to over-rate its importance in connection with engine design. To it are due the costly cooling arrangements which add so greatly to the weight of the engine; and, indeed, it is the main factor limiting the development of large power units with single cylinders.

It is of first importance, therefore, to obtain information relating to the factors governing heat flow from the working fluid. The experiments of Clerk and Hopkinson have made it clear that the rate of heat flow is vastly greater during the explosion and the early stages of the expansion stroke than during the later stages of the stroke, and further, that the average heat flow during expansion in any given engine increases in a greater proportion than the mixture strength, upon which, of course, the temperature developed depends. Both these facts are highly important from the point of view of the designer. The former made it possible for Hopkinson to apply his system of internal cooling. The latter made clear the great importance of working with as weak mixtures as is consistent with obtaining a reasonable amount of power in relation to the size of the engine. In order to gain further information in regard to heat loss, Prof. David undertook a series of measurements of the radiation and conduction losses during the explosion and subsequent cooling of inflammable mixtures of coal gas and air contained in a closed vessel. Two important results from the point of view of gas-engine design emerge from the experiments. The first emphasizes the marked influence of temperature on the heat loss from the working fluid both by conduction and by radiation, and the other indicates that the radiation loss per unit area of wall surface increases greatly with cylinder dimensions.

RESULTS.

Contrary to expectation from known physical laws, the rate of loss of heat at high temperatures varied approximately as the fourth power of the absolute temperature both in the case of conduction loss and of radiation loss. The importance of working with as low temperatures as is consistent with obtaining reasonable output per unit weight of engine is thus emphasized in a remarkable manner. It is found that the heat loss during the explosion-expansion stroke (which, of course, is practically the same as that taking place during the complete cycle when the loss during the exhaust stroke is not taken into account) varies approximately as the square of the maximum absolute temperature developed on the explosion of the charge in any given engine run at constant speed. By means of this result it is possible, after having determined by experiment the heat loss when the engine is working on a certain mixture strength, to predict from indicator diagrams the heat loss when it is working on a different mixture strength.

It is estimated that the radiation loss per unit area of wall surface varies as the square root of the linear dimensions in similar engines working under similar conditions. It is suggested that the total loss per unit area of wall surface in similar engines working under similar conditions may be given by the equation

$$H = C + R\sqrt{d}$$

where C is the conduction loss per unit area, and $R\sqrt{d}$ is the radiation loss per unit area, in an engine of diameter d. This loss in an engine of 150 cm. diameter may be about 50 p.ct. greater than that in a similar engine 30 cm. in diameter when run under similar conditions of mixture, strength, speed, &c.

LARGE ENGINES.

The cooling arrangements in gas engines are designed chiefly with the idea of reducing the temperature variation in the metal so as to avoid the setting-up of undue stresses, and of securing that local temperatures do not rise to a point sufficient to cause pre-ignition. Owing to the great thickness of metal and the difficulty of keeping the jacket water flowing effectively in every corner, the design of the cooling arrangements would be sufficiently difficult in large gas engines even though the heat loss per unit area increases with cylinder dimensions. The difficulty in the way of designing the very large-cylindered engine is thus a serious one unless steps are taken to secure lower gas temperatures in the working cylinder.

CRITICISM.

In the discussion on the paper, which was of a highly technical nature, while all agreed as to the value of Prof. David's work, several speakers disagreed with his conclusions. Sir Dugald Clerk opened the discussion, and supported Prof. David in his belief in the phenomenon of delayed combustion. In his view the author had completely solved the puzzle of the missing pressure. He thought the method adopted for increasing the effective dimensions of the explosion vessel was interesting; but how would the results so obtained compare with those given by actual vessels of dimensions equivalent to the hypothetical? Very different were the views of Mr. Pye, of Cambridge University, who opposed the author's conclusions with great vigour. Mr. Pye could not believe in the after-burning theory as playing an important rôle in the true explanation of the missing pressure. He argued that dissociation was the major cause—a view which Prof. David had dismissed. Whereas after-burning could be controlled, dissociation was a specific property of the mixture. The effect of ignition control and turbulence had not been mentioned by the author; and it was suggested that the figures for total heat loss should be considered with great reserve. Mr. H. M. Martin took the middle line between the views expressed by Sir Dugald Clerk and Mr. Pye. Prof. Bone put forward the view that such a complex mixture as coal gas was not a good medium on which to base assumptions as to the point of maximum pressure not coinciding with the attainment of complete combustion. As a chemist he found the author's results unsatisfactory, and held that the evidence of delayed combustion could by no means be regarded as conclusive. Time was so limited that Prof. David had the opportunity of making an immediate reply only to Mr. Pye on the question of dissociation. There was very little dissociation in a gaseous mixture at temperatures below 2000° C. In the case of the late Prof. Hopkinson's experiment, on the strength of which Mr. Pye based his belief in the dissociation theory, the temperature did not exceed 1980° C.

To the outside observer the meeting was in the nature of a fencing contest among highly-skilled technicians; and it seemed that either all were conquerors or all were defeated.

Southern Association of Gas Engineers and Managers.—A general meeting of the Association will be held on Tuesday, Nov. 25, at 2.15 p.m., at the Charing Cross Hotel, Strand, W.C. 2. The following papers will be read and discussed: "Notes on Carbonizing Temperatures," by Mr. W. H. Warren, of the Gas Light and Coke Company; "The Use of Live Steam in Purification," by Mr. F. J. Pearce, of the North Middlesex Gas Company; and "Commercializing the Distribution Department in the Service of the Public," by Mr. W. J. Sandeman, of the Croydon Gas Company.

AMERICAN GAS ASSOCIATION.

Review of Reports and Papers.

[SECOND ARTICLE.]

Gummy Deposits in Gas-Meters.

A paper on the causes and prevention of gummy deposits in gas meters, submitted by Dr. Ralph L. Brown, Organic Chemist, of Pittsburgh Experiment Station, Bureau of Mines, set forth various phases of an investigation into this matter. A preliminary survey of plants and meter repair shops showed that the gum troubles were cyclic and seasonal, with a maximum occurring in the winter; and coal gases have not been found, within the extent of the investigation, to give rise to gum troubles or to yield more than traces of condensate. Thus the identity of the constituents of carburetted water gas light oil, and particularly of its condensate or drip oil, became essential, and a specific study of the drip oil of one system was made. The unsaturated hydrocarbons were found to consist very largely of indene and styrene. The identification of these two constituents, and the amount of derivatives recovered, accounted for practically the total unsaturation in the drip oil. Thus the basis of gum formation is, the author says, apparently established, for both of these compounds are gum forming. Gums from drip oils and meters show a carbon-hydrogen ratio corresponding closely to that of indene and styrene resins. Drip-oil fractions rich in indene, and those rich in styrene, on standing either in air or protected from it, develop a heavy resin content. Oxygen is a secondary factor, since alone it can give rise to no gum, and is not essential to resinification; but if present, it enters into and accelerates resinification of the present-day carburetted water gas condensate. Its source is the air introduced into the gas to effect revivification *in situ* of the oxide of iron.

The character of the gas oil has a definite influence on the concentration of gum-forming constituents in the gas resulting therefrom. Within present-day practical cracking limits, an increase in cracking temperature causes a decrease in gum-forming constituents in the gas, and consequently a decrease in liability to gummy deposits. Likewise, as the cracking efficiency, or the degree of cracking, increases, with other conditions remaining the same, there is a decrease in gum-forming constituents in the gas. On the basis of experimental work done and experience gained, 1400° Fahr. is considered to be a more desirable cracking temperature than 1350° Fahr. Equally important with the range of operating temperature is its control. Continuous and careful control of the carburetting units of a water gas set is essential to the prevention of gummy deposits. The influences exerted by the other units of the generating systems on gum-forming constituents and gummy deposits are briefly discussed.

High-Pressure Gas Transmission and Distribution.

A general discussion of the subject of high-pressure gas transmission and distribution is contained in a paper by Mr. R. S. Fuller, Engineer of Distribution, Pacific Gas and Electric Company, San Francisco. In the opinion of the author, probably the greatest advantage possessed by the high-pressure method is its extreme flexibility, which permits response to varying demands for gas within wide limits with no change in the physical properties which would influence the amount of capital invested. There is an increasing field for gas for industrial and commercial purposes from consumers who will obtain the best economy at pressures considerably above the range of the low-pressure systems. Comparative costs are given of high-pressure and low-pressure distribution, based upon specified conditions. Increasing distance of the distribution system from the plant makes the use of high pressure the more advisable; and it is only in the case of the higher densities of consumers and high sales yearly per mile of main that the use of low pressure can be considered the more economical method. In the comparisons made, at no time is it necessary to employ an initial pressure on the high-pressure system of more than 30 lbs. per sq. in., while experience has shown that at pressures even up to 60 lbs. per sq. in., which may be considered the economical limit of single stage compression, there is no serious loss in thermal content of gas.

A number of curves are given in the paper, and with regard to these the author remarks: There are systems of such a size, and whose amount of business is such, that the costs shown by the curves make the choice between high pressure and low pressure easy, for in their cases the difference between the costs of the two methods will be great enough to at once preclude the method showing higher costs. In other companies, the line between the two will not be so well defined, and a closer study of some, or all, of the phases may become imperative. When the actual conditions are known this should not be difficult. Consideration should be given in all cases to the advantages possessed by the high pressure method, due to fewer complaints, better meter performance, &c.; and if this is done, the high pressure may well be used under conditions which would call for low pressure when costs, as brought out by the curves, are alone considered.

Carbonization and Complete Gasification.

The report of the Committee on Carbonization and Complete Gasification of Coal (of which Mr. E. H. Bauer, Worcester Gas Light Company, is Chairman) is a lengthy document. For one thing, the Committee have drawn-up a standard test code for carbonizing plants, with sufficient instructions and necessary tables to be a guide and standard for such work. They also sent out questionnaires regarding data of plant design and operating results to all coal gas plants in the United States; and the results are plotted on a chart, which shows that in almost all of the items plotted there has been a decided increase, comparing 1923 with 1924, in the amount of data kept by the various plants. A section is devoted to operating and labour-saving devices, and another to low-temperature carbonization.

The Builders' Section contains reports submitted by a number of manufacturers of carbonizing apparatus. The Isbell-Porter Company describe a modern Woodall-Duckham coal gas installation for the Roanoke (Va.) Gas Light Company, which will be arranged to operate in conjunction with the present carburetted water gas plant, to produce 650,000 c.ft. of coal gas a day, of about 540 B.Th.U. The application of the Becker principle to small gas ovens is described by the Koppers Company, with the remark that the system is proving to be of great importance to the gas industry. Two installations are in highly successful operation, two others are nearing completion, while a further two are in process of construction. The Parker-Russell Mining and Manufacturing Company deal with a gas-oven plant built at Kalamazoo, while the Russell Engineering Company supply details of an oven plant at Quincy, the Semet-Solvay Company of a bye-product coke and gas plant at Hamilton (Ontario), and the U.G.I. Contracting Company of a vertical retort plant at Manchester (N.H.). The report of the West Gas Improvement Company (Inc.), of New York, gives particulars of Glover-West continuous vertical retort installations at Watertown (750,000 c.ft. a day), Malden, Mass. (2,400,000 c.ft. a day), Pawtucket (reconstruction), Vancouver, B.C. (2,500,000 c.ft. a day—second installation), and Toronto (5,000,000 c.ft. a day). The installations of Glover-West vertical retorts in the United States, Canada, and South America now number eighteen, with a combined daily capacity amounting to 28 million c.ft.

Carburetted and Uncarburetted Water Gas.

Mr. J. S. Kennedy, of the Consolidated Gas Company of New York, is Chairman of the Carburetted and Uncarburetted Water Gas Committee, whose report (extending to 140 pages) is divided into several sections, on the lines of that of the Carbonization Committee. The Operators' Section report some recent developments in the working of carburetted water gas sets, and submit record forms which have been prepared to meet the requirements of the smaller plants or to guide them as to the data required for the purpose of keeping a check on plant operations and results. The Uncarburetted Water Gas Section deals with the manufacture and use of blue gas for mixture with natural gas supplied to the public and for heating coke ovens. Lastly, in the Builders' Section are presented current developments in the construction of water gas sets, appurtenances, and automatic controls, as well as some interesting contributions by operating companies on special equipment and devices.

A full account is given by Mr. W. J. Murdock, of Joliet (Ill.), of a practical application of the use of bituminous coal as generator fuel by the Coal Products Manufacturing Company. They have been operating on 100 p.ct. bituminous coal as water gas generator fuel for nearly five years, and thus far have experienced no distribution troubles whatsoever with this gas. Their experience from a manufacturing point of view leads them to the conclusion that for use with soft coal it might be well to consider the designing of a generator of small diameter, but considerably deeper than the standard equipment. Cleanliness, sizing, and uniformity of fuel are the greatest influencing elements; while another important factor is uniform regulation of pressure in the blast main, on account of varying resistance through the fuel bed. Water gas sets using bituminous coal as generator fuel should be operated in connection with waste-heat boilers, in order to effect the greatest economy. Reports of tests by various gas companies are also included.

Many plants are now using the modification of the regular method of operating a water gas set known as the "back run." Briefly stated, the "back run" system of operation consists in passing the down run steam through the superheater and carburettor before entering the top of the generator. The blue gas leaving the bottom of the generator passes to the wash box by a separate or "back run" connection. The up run is made in the regular way, and oil for enrichment is admitted only during the up run. Mr. O. H. Smith, of the Consolidated Gas Company of New York, makes a contribution on this subject, and says that, while in some cases the method has been in operation long enough to determine definite results, the published figures are sometimes confusing. Agreement is general as to there being a reduction in generator fuel; while in some instances increased capacity and improvement of oil efficiency are reported, and in others a slight loss of oil efficiency. It seems to be the experience so far that "back run" operation with coke as generator fuel gives a better saving in fuel than when anthracite is employed.

For use with both light and heavy oils, the empty carburettor system—known as the "chequerless" or "brickless" carburettor—was introduced in 1920. There are no chequer bricks, the distillation and cracking of the oil being accomplished by the radiant heat given off by the refractory lining of the carburettor walls and crown, and by the heat in the blue gases acting on the mist of oil.

During the past four years nine plants have been fitted up with this method, which has been found to possess the following advantages over the chequered carburettor: (1) Uniform oil treatment irrespective of the age of the set; (2) saving of labour for removing dirty chequer brick, cleaning same, and rechequering; (3) saving of firebrick necessary to replace loss by breakage in carburettor during rechequering and cleaning; (4) reduction in, and maintenance of uniform, resistance through the set; and (5) more working days per set per annum. Mr. John H. Wolfe, of the Baltimore Consolidated Gas Company, who reports, says that even with light oils, and especially with the return of high gas oil prices and the consequent use of heavy and crude oils, this system will furnish a successful solution to one of the water gas operator's chief troubles.

A section of the report by Mr. G. H. Warwick, of Pittsburgh, relates to the cleaning of generator fires and progress towards clinker prevention. Attention is drawn to attempts that have been made to solve the clinker problem. Experiments go to show that mechanically rotated grates will, in some cases, remove the ash that reaches the grate, and it is possible to prevent adhesion to the walls of the generator by using a water-cooled jacket, provided the steam generated can be utilized economically. It would seem therefore, the writer says, as if a generator embracing the combination of a rotating grate in conjunction with a water-cooled jacket would lead to the desired end of the mechanical removal of clinker.

The report of the Sub-Committee on Refractories contains an intimation from the Binghamton Gas-Works that they have had very satisfactory experience with so-called carborundum generator linings. The name of this is "Silcar," and it was furnished by the Seaboard Refractories Company, of Perth Amboy (N.J.). The fuel used in these generators is a good grade of anthracite coal, and the lining referred to appears to have reduced clinkering troubles to a minimum. Clinkers do not adhere, which reduces wear and tear on the lining. The adaptation to water gas generator practice of carborundum blocks made by the Bernitz Furnace Appliance Company is also described.

In the Builders' Section (under the chairmanship of Mr. H. L. Underhill, of Baltimore) interesting reports are submitted by manufacturers of water gas apparatus. Details of construction developments include an automatic water gas control installed for the purpose of operating on short cycles with great accuracy, producing a uniform quality of gas, requiring less materials and labour, reducing the wear on the apparatus and the amount of clinker in the generator, and increasing the capacity of the set.

There is a description of the Howard automatic charger for water gas generators. With this the fuel is charged into the generator during the down run on each cycle. The charger is operated by hydraulic cylinders, and the fuel spreader consists of a rotating disc which is lowered into the generator at each charging period, and discharges all the fuel against the side walls. As only the larger pieces roll to the centre, the fire condition is very uniform. There is also an even distribution of air; and, further, by introducing the fuel in small amounts, the fire bed is always maintained at its maximum active height. The charger is said to be specially valuable when used with soft coal, as the evolution of coal gas is kept uniform. Blow holes are practically eliminated, as even small ones are filled as soon as they are started. The finely divided fuel that is deposited along the side wall of the generator reduces excessive rate of combustion around the periphery of the machine, and keeps the ash accumulation distributed over the entire grate area. This avoids, to a very great extent, the formation of side wall clinkers.

The Western automatic control for water gas sets is operated by means of power derived from oil under pressure, and consists of two units. The first unit, or master cylinder, is located below the operating floor, and determines the proper functioning of the various hydraulically operated valves on the water gas set. The second unit is the power cylinder, supplying the motion of the master cylinder. The various valves are arranged so that any part of the cycle can be lengthened or shortened to suit operating conditions. This makes a very flexible control, as the cycle can be easily altered at any time while the machine is running, without necessitating any stop whatever. Any part of the cycle can be altered without changing the total cycle, or the total cycle can be altered and still maintain the same proportion for the various operations composing the cycle. On the power cylinder is a by-pass line containing a quick-opening gate valve for stopping the control instantly without shutting off the oil pressure. This feature enables a quick change to be made from automatic to hand control. Other automatic controls are the "W. G. I." model "B" and the "Kennedy," both of which are electrically operated.

Eastern District of the Southern Association.—We learn from the Hon. Secretary (Mr. L. Trewby) that the next meeting will take place on Nov. 13 at the Institution of Gas Engineers, 28, Grosvenor Gardens, S.W. 1, at 2.30 p.m.

Royal Society of Arts.—Papers to be read before the Royal Society of Arts after Christmas include one by Sir Dugald Clerk, K.B.E., D.Sc., F.R.S., the subject of which will be announced later. Dr. J. S. Owens, Assoc.M.Inst.C.E., F.G.S., will deal with "Modern Atmospheric Conditions." A series of three Howard Lectures, on April 20, 27, and May 4, will be delivered by Prof. J. S. S. Brame, F.I.C., F.C.S., on "Motor Fuels."

Coke Purity.

In an article contributed to the Metallurgical Section of the "Fuel Economy Review" (issued by the Federation of British Industries), Mr. Edgar C. Evans, B.Sc., F.I.C., of the Fuel Department of the Iron and Steel Federation, discusses coke purity, drawing attention to investigations which have been carried out in this country regarding the effect of high ash content of coke on fuel consumption in blast-furnace work. There are also reproduced from Presidential Addresses of Mr. E. H. Lewis comparative tables of the consumption of raw material and production of pig iron at coal-fired blast furnaces, which show that during the years 1919-20, when the coal used was notoriously dirty, the fuel consumption increased by 25 p.ct., while the output per furnace dropped by 20 p.ct. as contrasted with pre-war figures. As to high ash content of coke, Mr. Lewis has furnished results which indicate that this plays a far greater part in reducing the efficiency of the blast furnace than that which could be computed theoretically from the proportion of inert material in the fuel. Thus the reduction of ash (as well as of sulphur) in British coke is a matter of the utmost importance to the iron and steel industry. This leads Mr. Evans to deal with the cleaning of coal, and he sets out the advantages of pneumatic separation, a plant for which (described briefly by the author) has been erected at the M'Comas Colliery of the American Coal Company, West Virginia. The average ash content in the coal at the M'Comas Colliery was from 13 to 17 p.ct. on the 1 to 2 in. sizes, down to 10 p.ct. in the dust; the general average being 10 to 12 p.ct. The clean coal runs from 4½ to 5 p.ct. up to 6½ to 7½ p.ct.

Internal Corrosion and Deposits in Gas Mains.

Mr. W. V. Watson, in a paper submitted at the recent meeting, told the members of the Pacific Coast Gas Association that there is considerable evidence of pitting and corrosion in the interior of gas mains in the system of the San Diego (Cal.) Gas Company, of which he is Chemist. There is also a building-up of crystalline scale, and at times considerable service trouble from impalpable iron oxide rust. A large percentage of the sludge taken from the mains is composed of iron oxides, with a considerable proportion of sulphur. Some of the crystalline deposits found on valves contain as much as 97 2 p.ct. of sulphur. The acidity and the iron in solution increase rapidly after the gas leaves the plant. Tests show that the hydrogen sulphide is reduced during its passage through the mains. The organic sulphur is not reduced to an extent that can be detected by ordinary testing methods. The corrosion of mains is evidently caused by the action of the oxygen in the gas in the presence of moisture, forming oxide of iron. The hydrogen sulphide unites with this rust, and deposits the glistening sulphur which is found in such large quantities. Through changes in the temperature and moisture conditions, this scale is continually loosening, and fresh surfaces of metal become exposed. The fine powder is accounted for by having been in solution, and having later dried out. In addition to the obvious remedy of reducing the oxygen content of the gas to a minimum, and eliminating the last traces of hydrogen sulphide, experiments showed that, if the gas were thoroughly dried, it would completely stop the corrosion, and also eliminate naphthalene stoppages and the deposition of tar, oil, and gummy substances in the meters.

Submerged Welded Gas Main.

Relating experiences with welded steel gas mains, at the meeting of the Pacific Coast Gas Association, Mr. R. M. M'Calley, Superintendent of Distribution of the Portland (Ore.) Gas and Coke Company, made special reference (as being one of the most remarkable uses of welded steel pipe) to the laying of a 16-in. submerged line under the Willamette River, which at the point of crossing is 1800 ft. wide, and varies in depth from 20 to 30 ft. at low water. The bed is composed of sand, gravel, and silt. A trench varying from 6 to 10 ft. deep, according to the irregularites of the bottom, was dredged across the river, and the pipe was welded into four sections, each approximately 450 ft. in length. Each section was filled with water, and hydrostatically tested; the water being left in while the pipe was pulled across the river, to prevent it from floating. Power for the pulling was secured from winches on a derrick scow moored to a large pile dolphin just off the shore. As each successive section was pulled out, a new section was rolled on to the skidway and welded on to the preceding one. No trouble was experienced in pulling the four sections out, in spite of the tremendous resistance. After the line had been completely laid and tested, piles were driven on the down-stream side at 50-ft. intervals, and the pipe was clamped to the piling with 1¼-in. U bolts. The trench was afterwards back-filled with the dredge. A hydrostatic test was maintained during the pile driving and back-filling, in order that any trouble might be immediately detected. Mr. M'Calley's paper was based on experience gained during the installation of 500 miles of steel mains from 1 in. to 32 in. in diameter—including 17 miles of pipe ranging between 16 in. and 32 in. This experience, he says, seems to indicate that, for Pacific Coast conditions, welded steel pipe is to be preferred to other standards of construction for underground mains, not only because of its basic economy, but also in the interests of leakage control.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

Electric Hotplates.

SIR,—I have just had brought to my notice your issue of Aug. 13, containing comments on my letter on the subject of electric cooking, which appeared in the "Electrical Review" for Aug. 1. By the omission of a rather important phrase, you have quite altered the meaning of my letter. In my original letter I described the boiling-plates as "1·3-KW. open hotplates, *of the oldest type*, in which the elements are quite 1-1½ in. below the utensil." In your alleged quotation you have thought fit to omit the words "of the oldest type," thus misleading your readers into thinking that my criticism is directed against all electric cookers, even those fitted with the latest hotplates.

On the contrary, my letter was written to draw attention to the negligence of the Newcastle-upon-Tyne Electric Supply Company in hiring-out cookers with such particularly inefficient boiling-plates. Two very important improvements in the hotplates have to my knowledge been introduced by the makers of the cookers in question since they first brought out the boiling-plates I criticized.

I should like also to draw your attention to the fact that not one of the six dissatisfied users I mentioned had any complaint to make regarding the cost of electric cooking. The unit price is 1½d., since reduced to 1d.

With reference to your oft-repeated question: "If a kettle must be supplied, why not a whole series of self-contained saucepans for the many and varied operations of the kitchen?" the answer is simply that such a series of saucepans is unnecessary, given an up-to-date cooker and a self-contained kettle. You do not appear to understand the correct use of an electric kettle in conjunction with an electric cooker. The kettle is used not only for water-boiling for tea-making, &c., but also for bringing to the boiling-point all water required for vegetables and for other cooking operations. This results in a marked saving in current consumption, which is easily understood when one remembers that much more fuel is used in first bringing a pan of vegetables to the boil than is used in the subsequent simmering till done.

Soon the manufacturers will evolve a boiling-plate so efficient that a self contained kettle will be unnecessary, and then, I venture to suggest, gas cooking will follow gas lighting. "CUISINIER."

[We heartily thank "Cuisinier" for his communication. His original letter does not appear to have been preserved; and so we will accept his statement that we omitted the words "of the oldest type" from the comments in "Electricity Supply Memoranda" on Aug. 13—so many weeks ago that the matter had been almost forgotten. The omission of the words, however, does not really make much difference, seeing that we mentioned that the hotplates were of the open type, and situated 1 to 1½ in. below the utensil—a distance to which electricity has a strong objection when its function is heating for boiling purposes. So much for the "alleged quotation," which, by the way, was not a quotation, but merely a paraphrase. As to the six dissatisfied users "Cuisinier" alluded to as not having any complaint to make regarding the "cost" of cooking, we believe he made a statement to the effect that he had instituted inquiries among his friends, and found that, of seven who had installed cookers, there was only one who would not gladly change back to gas could this be done without further expense or trouble. Those six friends, several gas undertakings in different parts of the country know are not isolated examples. "Cuisinier" speaks of improvements having been made in the hotplates. Nevertheless, in his original letter (and the same is implied in the present one), he advocates, as an adjunct of the electric cooker, the use of a self-contained kettle, which is a frank confession of continued inefficiency of the hotplate. It seems we do not understand the use of an electric kettle in conjunction with an electric cooker. We formerly asked the question why, if a self-contained electric kettle is necessary with an electric cooker to aid in boosting-up its efficiency, a whole range of self-contained saucepans should not be adopted? The answer of our correspondent is that the kettle is required for bringing to boiling-point "all" water required for vegetables and other cooking operations. We want to be serious in dealing with this matter, but our friend must excuse us if we confess that we are smiling as we write. However, in his opinion, the manufacturers will soon evolve a boiling-plate so efficient that a self contained kettle will be unnecessary; and then he ventures to suggest that gas cooking will follow gas lighting. Has it occurred to him to make a survey to ascertain the extent to which gas lighting is still in use? We advise him to get better acquainted with the subject. That by the way. There will have to be a revolution in efficiency at the generating end of the electricity system before his prophecy can be fulfilled. One point more. "Cuisinier" appends his name to the letter, to comply with editorial requirements. But he has succeeded in making it so illegible that we have failed to decipher it.—ED. "G.J."]

The Keady (co. Armagh) Urban Council have reduced the price of gas by 1s. 8d. per 1000 c.ft.

LEGAL INTELLIGENCE.

DUBLIN GAS COMPANY'S NOVEL CLAIM.

In the Dublin Circuit Court, before Mr. JUSTICE DROMGOOLE, the Alliance and Dublin Consumers' Gas Company claimed compensation from the Free State Government for gas lost in an explosion which occurred at the destruction of the Four Courts and also at the destruction of a large area in Sackville Street during the political revolt in June and July, 1922.

Mr. LARDNER, K.C., for the Gas Company, submitted that gas was a chattel and capable of being transferred from place to place, and that it was a subject of larceny at common law. He argued that gas was "property" within the meaning of the Act, and that applicants were entitled to compensation.

For the State, Mr. J. A. COSTELLO said they should first have proof that gas did escape. They had no proof to that effect. When it was forthcoming he would be prepared to argue the legal aspect of the case.

Mr. LARDNER expressed surprise at this attitude, as he understood the State admitted that gas did escape.

His LORDSHIP remarked that, if he found that gas did not come within the meaning of the Act, there would be no necessity to prove whether there had been an escape or not.

Mr. COSTELLO contended that gas was not a chattel, and that it was not covered by authority. The principle underlying the definition of the word "chattel" was that a chattel was something which could be passed by manual delivery. Gas, he submitted, could not be handled and delivered in the same way as water.

Mr. LARDNER pointed out that, as a matter of fact, applicants delivered gas in bags to hospitals in the city. From the scientific point of view, he said, gas was tangible, movable, and visible.

His LORDSHIP held that gas was a chattel and property within the meaning of the Act.

Mr. LARDNER then asked that the case be allowed to stand so that his clients and representatives of the State might go into figures. This would simplify matters very much, as there were between 12 and 20 witnesses to be examined.

The suggestion was agreed to, and the case adjourned for further hearing until December.

REGISTER OF PATENTS.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for Oct. 29.]

Nos. 24,846 to 25,471.

ANDREWS, W. F.—"Gas-heated geysers." No. 25,125.
BAILEY, R. W.—"Gas or oil power plant." No. 25,078.
DUFFIELD, F. L.—"Production of gas from powdered carbonaceous matter." No. 25,071.
HARTLEY, H.—"Gas cooking-stoves." No. 25,460.
KEITH, G.—"Grill or gas cooker." No. 25,321.
KEITH AND BLACKMAN COMPANY, LTD., J.—See Keith, G. No. 25,321.
MADELL, J. W.—"Gas cooking-apparatus." No. 24,989.
MALBAY, R.—"Semi-water-gas producer plants." No. 24,933.
MALBAY, R.—"Means for supplying compressed gas to internal-combustion engines." No. 25,281.
METROPOLITAN-VICKERS ELECTRICAL COMPANY, LTD.—See Bailey, R. W. No. 25,078.
MICHALSKI, K.—"Converting coal into gas." No. 24,929.
RADIATION, LTD.—See Hartley, H. No. 25,460.
SHALLCROSS, W. M.—"Regulating gas-collecting mains and coke-ovens." No. 25,065.
STÉ. L'AIR LIQUIDE STÉ. ANYE. POUR L'ETUDE ET L'EXPLOITATION DES PROCÈDÉS G. CLAUDE—"Production of coke." No. 24,925.
SPENCER, S. E.—"Bottom grids for gas purifiers." No. 25,098.
TARPER, A. H.—See Andrews, W. F. No. 25,125.

Lighting Trades, Ltd.

The fourth annual general meeting of Lighting Trades, Ltd., was held last Friday. Mr. H. J Mitchell (the Chairman of the Company), who presided, said that the results of the year's working, which showed a trading profit of £12,000, were very satisfactory. This was a distinct improvement, towards which contributory factors had been the economies effected by the overhauling of the administrative and selling organization, and the closing of redundant factories. As regards the sales, there had been an increase of 15 p ct. compared with the previous year. Continental competition, said the Chairman, was still very acute, and their position had not been made easier by the fact that the only measure of protection which was afforded the industry—namely, the duty under Part II. of the Safeguarding of Industries Act—had been withdrawn. In pursuance of the policy to broaden the basis of the Company's activities, the sale of lamps, burners, glass, &c., had been conducted energetically. He had hoped to submit a scheme for the reorganization of the capital of the Company, but this had been delayed in consequence of negotiations with the Inland Revenue authorities in respect of their claim for refund of excess profits duty.

On account of the current year, the Directors of Meters, Ltd., have declared dividends at the rates per annum of 5½ p.ct. on the preference shares and 5 p.ct. on the ordinary shares.

XUM

MISCELLANEOUS NEWS.

GAS COMPANIES' PROTECTION ASSOCIATION.

Annual General Meeting.

The Twenty-Seventh Annual General Meeting of the Association was held last Thursday, in Caxton Hall, Caxton Street, Westminster, under the Chairmanship of Dr. CHAS. CARPENTER, C.B.E. The register of attendance showed that the membership was represented on the occasion by the following gentlemen: Messrs. R. W. Edwards (Aldershot), C. M. D. Belton (Shrewsbury), W. H. Johns (Swansea), W. F. Whittaker (Grays and Tilbury), W. S. Morland (Gloucester), A. Pickering (South Shields), Chas. F. Botley (Hastings and St. Leonards), D. H. Helps (Reading), C. M'Pherson (Clay Cross), J. L. Garrard (Eastbourne), R. J. Auckland (Cardiff), and F. C. Briggs (Dudley).

Mr. R. G. COOPER, on behalf of the Secretary (Mr. F. E. Cooper), read the notice convening the meeting and the minutes of the last meeting, which were duly confirmed.

ANNUAL REPORT.

The annual report of the Committee was as follows:

The Committee herewith present the revenue account and balance-sheet, together with a report of the proceedings of the Association for the year ended Sept. 30, 1924.

The ascertained expenditure amounted to £361 10s. 8d. The revenue was: Subscriptions and donations, £487 4s.; interest on War Loan, £72 10s.; amounting together to £559 14s., leaving a surplus for the year of £198 3s. 4d. From the balance-sheet it will be seen that the assets amount to £1840 10s. 8d., consisting of £1450 5 p.ct. War Loan, 1929-47, at cost, £1377 10s. (the value of which at the date of this report is £1486 5s.); balance at bank, £458 14s. 2d.; and cash in hand, £4 6s. 6d.

Since Sept. 30, 1923, the sum of £11 11s. has been received in respect of subscriptions in arrear, reducing the amount outstanding to £25 4s. The Statutory Gas Companies (Electricity Supply Powers) Bill, to which reference was made in the Committee's report for last year, promoted for the purpose of overcoming the difficulties standing in the way of statutory gas companies obtaining electrical powers, was on May 27 presented to the House of Commons by Mr. Reginald G. Clarry, supported by Sir William Cowan, Mr. Clayton, Colonel Watts-Morgan, Mr. George Spencer, Mr. Haydn Jones, and Mr. William Albert Jenkins. Mr. Clarry was successful in getting the Bill read a second time on June 2, and at the time of the dissolution of Parliament it awaited consideration by a Standing Committee. It is hoped that the Bill will be re-introduced into the new House of Commons.

A matter to which the Committee gave careful consideration—involving as it did a question of principle—was a dispute between one of its members and the London, Midland, and Scottish Railway Company, as to the mode of laying a main under a level crossing belonging to the Railway Company. The proposals of the Railway Company were made in pursuance of a common policy now being pursued by all railway companies, to get a clause embodying the conditions sought to be imposed in the case in question inserted in every Act and Order promoted by gas, water, and electricity companies. The Committee advised the Gas Company to resist the demands of the Railway Company, and promised the assistance of the Association in the matter. The dispute was subsequently submitted to arbitration, the award being in favour of the Gas Company. The Arbitrator ruled that the ordinary cast-iron main laid in the usual way met the requirements of the case, and ordered the Railway Company to pay the Arbitrator's fees.

Towards the end of the Session of 1924 the House of Lords appointed a Special Committee to inquire into the question of Special and other Orders coming before the House of Lords for confirmation by resolution of the House, and of the procedure thereon. As the subject affected the cost of applications to the Board of Trade for Special Orders, the Committee took the matter up, and the Secretary was instructed to write to the Chairman of Committees of the House of Lords, asking that the Association might have an opportunity afforded to them of giving evidence before the said Committee. As, however, the Committee of the House of Lords had decided not to take evidence, the Secretary was instructed to write to the Clerk to the Committee, pointing out the advantages, as regards economy and expedition, of procedure under the Gas Regulation Act, and expressing the hope that there might be no reversion to the Provisional Order system.

The Committee considered a request by the Hastings and St. Leonards Gas Company that the Association should assist them in opposing the Hastings Corporation Bill in the House of Commons, with the object of securing the insertion therein of the Winchester Clause or of obtaining protection in respect of expenses of the Corporation's electrical undertaking charged to rates. As questions of principle were involved in the matters in dispute, and as the Association were in full sympathy with the Company and the course they had adopted to combat the action of the Corporation, it was decided to offer substantial financial support to the presentation of the case for the Company.

The question of the assessment of the Association for income-tax, referred to in the last report, assumed a more acute phase during the past year, in consequence of the disallowance by the Inspector of Taxes of items charged to revenue in respect of the costs incurred by the Association in connection with the Public Utility Companies (Capital Issues) Bill, 1920, and the Finance Bill, 1920.

The Income Tax Sub-Committee having recommended that the Association should appeal against the assessment, the Committee authorized the appeal, which was duly heard; the case for the Association being conducted by the Secretary. The result was that the two disputed items were allowed and the assessment was discharged. Subsequently, the Secretary received a communication from the Inspector of Taxes, intimating that the Inland Revenue authorities had decided to accept the decision of the Commissioners. As in past years, the Income Tax Sub-Committee, as a Committee, and also by its Chairman and the Secretary, have given valuable advice to members of the Association on numerous income-tax questions. The Committee record with great regret the resignation of their colleague, Mr. George Clarry, consequent upon his retirement from the Cardiff Gas Light and Coke Company. Mr. Clarry was one of the representatives of gas companies elected to draw-up the original rules of the Association in 1898, and had been a member of the Committee since its formation. The Committee take this opportunity of recording their high appreciation of the services rendered by Mr. Clarry to the Association and incidentally to the gas industry generally, and on behalf of the Association to record its hearty thanks in appreciation thereof. Mr. R. J. Auckland, Secretary of the Cardiff Gas Light and Coke Company, has been elected to the Committee in Mr. Clarry's place. Another change in the Committee has been the election of Mr. W. S. Morland, of the Gloucester Gas Light Company, consequent upon the resignation of Mr. William Stanford.

During the year under review the Secretary has had considerable correspondence and interviews with members on legal and technical points, the following being some of the principal matters upon which he has given information and advice: Disqualification of Director interested in contract with company; depreciation scheme; deficiency of cash in prepayment meter; assessment of gas-works; method of charging for electrical energy by a corporation; charging cost of carburetted water gas plant to revenue—income-tax; claim for damages arising from gas explosion; disturbance of mains, &c., consequent upon alterations of public highways; laying of gas mains on grass verge of public road; laying of gas main in concrete at level crossing; re-instatement of roads; contingency fund; local authority requiring that service pipes should be laid in concrete; officers' superannuation fund; unification of the coal mining industry; pension and superannuation funds; charging part of cost of new carbonizing plant to revenue; laying of telegraph cable over gas main; interference by electric power company with non-statutory gas company's mains, &c.; "standard requirement" scheme of charging for gas; supply of gas to premises situate beyond company's existing mains; water gas house at gas-works—compliance with local building regulations; disqualification of councillor being a director of a company contracting with local authority (consequent upon the recent decision in Lapish *v.* Braithwaite); interest on debenture stock paid tax free.

The following members retire from the Committee in accordance with Rule 12: Mr. R. W. Edwards, Mr. R. Bruce Anderson, Mr. R. J. Auckland, Mr. Douglas H. Helps, Mr. W. H. Johns, and Mr. W. S. Morland, all of whom offer themselves for re-election.

The CHAIRMAN then moved that the report of the Committee and the accounts for the year ended Sept. 30, 1924, be received and adopted, and that a copy of the report be entered on the minutes. In doing so, he said he could not help thinking, when Mr. Cooper was reading that rather long story of the proceedings last year, what an interesting meeting it had been, though he had not quite realized at the time that it was so. He also, in one sense, felt a certain amount of regret, in moving as Chairman the adoption of the present report, that there were not so many interesting matters to discuss on this occasion. It was, however, unnecessary for him to point out that the continued usefulness of an Association of this character could not be measured by what might be termed increasing high-pressure activity. It was not always that they had things before them of the importance of the therm and carbon monoxide inquiries, or, to go further back, the Standard burner; but what they had to bear in mind was the necessity of keeping the organization always ready to deal with matters of that kind, because one never knew what was going to crop up. There were ever those who were interested in attacking the industry from one point or another, and they had to be prepared to meet these attacks, which might come from quarters unexpected or the reverse. This was why it was so very important that those associated with the management of gas companies should continue, and so far as they could increase, their interest in this old Association which was promoted for the benefit of their undertakings.

THE ASSOCIATION'S GOOD RECORD.

He need not remind them that this was the twenty-seventh annual general meeting, which implied the fact that the Association had been in existence for twenty-seven years, and they could justly feel proud of their record over this long period. ["Hear, hear."] He did not know whether he ought to apologize for what appeared to be the leading part played by the London Gas Companies in the Association; but he imagined it arose from the confident belief that the greatest possible strength lay in the greatest possible unity. He did not think it was because the London Companies had any doubt as to their ability in general to protect their own interests. The Association was founded by a man who was particularly blessed with long foresight, and the idea of combining the chief London Companies with the companies throughout the country was carried into effect in order to increase the unity of the industry, and more especially to strengthen the hand of those smaller undertakings who, not alone on account of size, but more particularly perhaps for geographical reasons, were so far removed from the centre of activity, which, in these matters, might be described as Westminster. Thus he might put it in another way, and say that the interest which London had in the past taken in the affairs of the Association was an indication of their recognition of the importance that attached to that part of the industry the responsibility for the conduct of which was in the hands of gas companies being able to speak with united, and no uncertain, voice on matters pertaining to their welfare and their interests.

SOUND FINANCIAL POSITION.

With regard to the financial side, the balance-sheet was in a satisfactory condition, because it revealed an income larger than the expenditure. There was a balance at the bank of £458, which was an excellent feature. They might also congratulate themselves upon the state of their investment, for the War Loan which cost £1377 stood, when the report was drafted, at a value of £1486. Since the printing of the report, too, the outstanding subscriptions had been reduced to a total of £19 19s., which was very satisfactory.

ELECTRICITY SUPPLY POWERS BILL.

Perhaps he might just run through the report, and deal with some of the matters which seemed to be of greater importance. First of all he would refer to the Bill the purport of which was to get over the difficulties which stood in the way of statutory companies in obtaining powers to supply electrical energy. He had spoken a few moments ago of foresight; but if they went back farther still, they might say that those who preceded them were perhaps a little lacking in foresight when they allowed the "sister industry" to be built up alongside them, without any idea of that collaboration and working together which appeared to be so successful on the other side of the Atlantic. This condition of affairs was not likely to be altered to-day so far as concerned the larger undertakings, but no doubt there were a great number of small ones where the generation of electricity could be profitably undertaken on the land occupied by the gas-works, and with

plant provided by them. Mr. Reginald Clarry, M.P., was successful in getting the Bill read a second time on June 2, and the report said it was hoped that it would be re-introduced into the new House of Commons. Of course, they must not "Hulloa" until they were out of the wood, but they now had the satisfaction of knowing that their Vice-President, Mr. Clarry, had been returned with an increased majority, and he did not expect he would be less interested in their affairs when the new Parliament met than he was in the old one. They might communicate with Mr. Clarry, and say how pleased they were to see he had got back in greater strength than before, and if this was the wish of those present he would ask the Secretary to do it. ["Agreed."]

LAYING A MAIN UNDER A LEVEL CROSSING.

The next matter was one which was discussed at the last meeting, and it related to the policy of the railway companies, which was to get a little bit here, a little bit there, and a little bit somewhere else, whenever they could. They had been pursuing this policy in respect of a main which was required to be laid under a level crossing, and he need not remind them that the Association felt rather strongly on the matter a year ago. The Gas Company involved were advised to resist the demands of the Railway Company, and eventually the dispute went to arbitration. It was gratifying to know that the arbitrator decided that the ordinary cast-iron main laid in the usual way met the requirements of the case, and ordered the Railway Company to pay the arbitrator's fees. As representing gas undertakings, they must all be pleased that the arbitrator took this view.

SPECIAL AND OTHER ORDERS.

The House of Lords appointed a Committee to inquire into the question of Special and other Orders coming before them for confirmation by resolution of the House, and of the procedure thereon. He was not quite sure that he appreciated the attitude of the House, but possibly the point arose through some feeling of jealousy with regard to maintaining to the fullest extent the privileges of both Houses. What the Association did, at any rate, was to bring to the notice of the Clerk of the Committee the importance of maintaining, as far as gas companies were concerned, the existing procedure, which in very many cases had proved much more simple in application than the old Provisional Order system. All they could do was to call attention to the fact that the altered procedure under the Gas Regulation Act was an advantage to the gas undertakings—and therefore an advantage to the public, in that it reduced the cost and shortened the time involved in these applications—and to express the hope that there would be no reversal of this new procedure.

UNFAIR ELECTRICAL COMPETITION.

Then there was the case of the Hastings and St. Leonards Gas Company, which had reference to the point of ensuring that suppliers of electricity, when it was a municipal undertaking, should charge a fair and reasonable price for it. When dealing with this knotty question, it had always been very difficult—though gas companies had from time to time had the sympathy of Committees of the House in respect of the protection they asked for—to apply the clauses granted; and in the case of the Hastings and St. Leonards Gas Company it was suggested that the Association might assist them in their opposition to the Bill of the Corporation in the House of Commons. They were in full sympathy with the efforts of the Company, and he thought the Committee of the Association were in agreement with him that there were very few companies who had put up such a good fight as had that Company against unfair competition by an electrical department. The Association were anxious to help them to the fullest possible extent, and had offered to give them a subscription in respect of their costs. The Gas Company, however, while thanking them for their sympathy, decided that they would not avail themselves of any such contribution.

INCOME-TAX.

The question of the assessment of the Association for income-tax had also been discussed, and there, again, owing to the pertinacity and ability with which their Secretary fought the income-tax people, the suggestion that had been made by the authorities was turned down, and the Inland Revenue decided to accept the ruling of the Commissioners. A year ago he referred to the usefulness of the work of the Income-Tax Sub-Committee, and he would like once more to emphasize this point. Speaking generally, he might remind members of the Association that there were many occasions on which members in different parts of the country might be face to face with a fresh problem pertaining to managing matters with which they might have to deal, and in such cases the organization provided by the Association had been, and must continue to be, most helpful. Members would get, by communicating with the office, the best possible advice with regard to any knotty question that might arise. The statement in the report on this subject was: As in past years, the Income-Tax Sub-Committee, as a Committee, and also by its Chairman and the Secretary, have given valuable advice to members of the Association on numerous income-tax questions.

MR. GEORGE CLARRY'S RETIREMENT.

The Committee, in their report, referred with great regret to the resignation of their colleague, Mr. George Clarry, and reminded the members that he was one of the representatives of gas companies elected to draw-up the original rules of the Association, and ever since 1898 had been a member of the Committee, until his resignation on retiring from his position with the Cardiff Gas Company. The Committee recorded their high appreciation of the services rendered by Mr. Clarry to the Association, and incidentally to the gas industry generally, and tendered to him their hearty thanks. He did not think that any one could have come in contact with that gentleman without forming the opinion that he was in every respect an estimable colleague. He had the welfare of the industry most thoroughly at heart, and was exceedingly helpful to the progress of the Association, in which he took a keen interest right up to the date of his retirement. They greatly regretted his loss, not only as a member of the Committee, but as a personal friend.

THE ASSOCIATION'S HELPFULNESS.

Finally, the report indicated some of the principal matters upon which the Secretary had been consulted from time to time. They were very varied, and gave point to what he had said regarding the utility of the Association, not only to the larger works, but more particularly to the small ones. The year had been an uneventful one, and he could not feel that he had been able to interest them very much that afternoon in the work of the Association. Perhaps his strongest point had been to remind them, as he had done, of what had been accomplished, not so much in the last twelve months, but in the previous history of the Association, and to assure them—assuming they gave their continued support, of which he felt confident—that they had at hand an organization capable of dealing with any matters that might arise in the future, he hoped with no less success than had been the case in the past.

BE PREPARED.

The VICE-CHAIRMAN (Mr. R. W. Edwards, of Aldershot), in seconding the adoption of the report and accounts, remarked that Dr. Carpenter had covered in a most comprehensive manner the work that had been done by the Association. They must all have been struck by what he had said as regards the origin of the Association. The gas industry was to-day in a most prosperous condition; it was on the crest of the wave. And largely this position of the industry was due to the very efficient services that had been yielded by the various organizations connected with the industry as a whole—and not least by their own Association, which devoted itself to the interests of gas companies. Dr. Carpenter, with great modesty, passed quickly over what had been done in regard to the No. 2 Burner—the Carpenter burner—but this he (the speaker) thought was one of the greatest blessings that had been secured for the gas industry prior to the introduction of the Gas Regulation Act. His work also in connection with the Carbon Monoxide Committee was invaluable, and helped the industry to face a problem which at one time appeared to be rather serious. What, however, he (Mr. Edwards) wished chiefly to impress upon them that day was that they must "keep their powder dry." While it was a fact that the industry was increasing all round at the present moment, there was no doubt it would, before many more years had passed, be in the midst of most strenuous competition from electricity. Those who were in any way associated with electricity realized its potentialities, and these potentialities, backed-up by the advantages which would accrue from Government support, would permit of the production and distribution of electricity at such low figures in the near future as only those gas undertakings which, in these days of prosperity, made due preparations by laying down and maintaining the highest quality of plant and providing the most modern appliances, would be able successfully to compete against. They must be ever on the alert in watching what was now on foot in connection with electricity. As evidence of this he quoted an article appearing in the current issue of the "GAS JOURNAL," on "Gas *v.* Electricity at Leicester," which dealt with an inquiry by a Committee of the Corporation. All who were responsible for the maintenance and extension of gas-works should bear in mind that they must keep up to date in every way. He felt convinced that this organization, which had served them so well in the past, would be called upon in the future to yield them even more devoted service.

After a conversational discussion, the resolution was put to the meeting and carried unanimously.

RE-ELECTIONS.

The CHAIRMAN, moving the re-election of the President and Vice-Presidents, said Sir J. Fortescue Flannery, Bart. (the President), had sent a telegram expressing regret at his unavoidable absence from the meeting, and his best wishes. The Vice-Presidents (Messrs. H. E. Jones, Charles Hunt, and Reginald G. Clarry, M.P.) were well known to all of them.

The VICE-CHAIRMAN seconded the proposition, which was agreed to.

On the proposition of Mr. W. F WHITTAKER (Grays and Tilbury), seconded by Mr. C. F. BOTLEY (Hastings), the meeting re-appointed the retiring members of the Committee—Mr. R. W. Edwards, Mr. R. Bruce Anderson, Mr. R. J. Auckland, Mr. Douglas H. Helps, Mr. W. H. Johns, and Mr. W. S. Morland.

The Hon. Auditor (Mr. W. A. Scott) was re-elected, on the proposition of Mr. W. H. JOHNS (Swansea), seconded by Mr. J. L. GARRARD (Eastbourne), who suggested that it might be advisable to sell the War Loan and re-invest the proceeds in Consols.

VOTES OF THANKS.

The CHAIRMAN said it afforded him much pleasure to propose a hearty vote of thanks to the Secretary for the admirable manner in which he had conducted the affairs of the Association during the past year. Mr. Cooper was always available, and he possessed a wonderful knowledge of matters which were of importance to an organization of that kind. He was devoted in his efforts on behalf of the Association, and they would never get anyone else to perform the duties with anything like the intelligence and care that he bestowed upon the work.

The VICE-CHAIRMAN, in seconding the vote, emphasized the great value of Mr. Cooper's services to the Association, and his readiness at all times to answer the most difficult questions that members could put to him. He also made reference to the services of Mr. Campbell Cooper, who was associated with them in his capacity as Parliamentary Agent, and who was a brilliant man on all matters of parliamentary procedure.

The SECRETARY, in acknowledgment, said it was no doubt the fact that he could give members useful information at times, because the Association having been in existence twenty-seven years, and he having been Secretary throughout the whole of this period, he must have gained some experience.

Mr. CAMPBELL COOPER also responded, and said the remarks which had been made regarding his services were very highly appreciated by him. His memory went back to the days when the Association was first formed, and recalled the fact that Sir George Livesey had asked him whether he would undertake the Secretaryship. He knew, however, that his brother could do the work much better.

The VICE-CHAIRMAN next proposed a vote of thanks to the Chairman, remarking that those of them who knew Dr. Carpenter intimately realized his outstanding value. He was a veritable giant in promoting and assisting the welfare of the great industry of which

they were all so proud. They were deeply indebted to him for devoting so much of his time to the interests of their Association. He also drew attention to another of Dr. Carpenter's attributes—namely, that he was able to bring into the meeting such an atmosphere of real good fellowship. This had enabled them to compare notes in a way which would not otherwise have been possible.

Mr. BOTLEY seconded, and said that, looking back over his career, he often wondered what would have happened to the industry if they had not had men like Dr. Carpenter, Sir George Livesey, and others, to help them through the many difficult times with which they had been faced. It must not be forgotten that this Association was the original organization to do anything for the gas industry, and it was due to the London Gas Companies that they had been able so to combine. Perhaps there were some brains in the provinces, but at the same time there was not much money, and money was required to keep the Association going.

The motion was carried with acclamation.

The CHAIRMAN thanked them for the kind way in which the vote had been proposed and passed. With regard to the monetary contributions of the London Gas Companies, the fact must not be overlooked that the provinces had contributed very largely in brains to the running of the Association. Despite their handicap, those who lived a long way from London were not less regular attendants than those who resided within the Metropolitan area, and their able discussion of the various points that came from time to time before the Committee was exceedingly helpful, and showed no lack of appreciation of the importance of the problems facing the industry. He was convinced that the Association would play in the future a no less important part than it had played in the past. All the money they could get into their coffers they could guarantee would be very carefully used. It was possible to do a good deal of this kind of work without making a very great splash in doing it. The Association was happy in its officials and in its Committees. They were indebted to Mr. Edwards for the warning he had uttered. It would never do to run away with the idea that, because the gas industry was getting large increases at present, the future was assured. They could not afford to shut even one eye, but must always be on the alert. The more prosperous the period, the more alert must they be; for these were the times in which they had to provide against the increasing competition which was bound to come in the future. The person who made the best uses of his resources today was the most likely to be in a position to meet that competition when it arrived. They must do their utmost to keep down prices, while at the same time taking care not to starve their undertaking.

AN ASSISTANT SECRETARY.

The CHAIRMAN said it was proposed to give assistance to the Secretary by appointing his son (Mr. R. G. Cooper) Assistant Secretary. The Secretary wished this to be without remuneration, though the Committee would have preferred to attach some small salary to the appointment.

The VICE-CHAIRMAN pointed out that the Secretary had not of late enjoyed the best of health, and that his son, who was qualifying as a solicitor, would be able to help him materially.

This concluded the proceedings of the meeting, after which (at a Committee meeting) the Chairman of the Association and of the Committee (Dr. Charles Carpenter) and the Vice-Chairman (Mr. R. W. Edwards) were re-elected.

RENFREW GAS-WORKS.

Installation of Vertical Retorts.

At a cost of approximately £27,000 the Town Council have erected an installation of eight vertical retorts of the Woodall-Duckham type, with provision for a further extension should this be considered necessary. The output of the plant is approximately 539,000 c.ft. of gas per day, which could be increased, by further extension, to 808,000 c.ft.

To mark the occasion of the opening of the installation, the Renfrew Town Council last Friday entertained a company of about eighty representatives of the gas undertakings of the various local authorities in Scotland. The party was conducted through the gas-works by Provost Ferguson, who, at the outset, formally opened the new plant by starting the gas engines and switching-on the power. The guests were thereafter entertained to luncheon in the Council Chambers—Provost Ferguson presiding.

The toast of "The Gas Committee and the New Works" was proposed by Councillor Renfrew, Glasgow, who referred to the fact that the present Gas Manager of the Glasgow Corporation was previously associated with Renfrew, while Mr. Daniel S. Munn, the Manager of the Renfrew Gas-Works, was formerly one of their Glasgow Engineers. He congratulated Renfrew upon their foresight in introducing the vertical retort system, and stated that they were working on the right lines. Glasgow had spent fully £2,000,000 in improvements in the gas undertaking, and it had been estimated that there was a possibility of a profit of from £100,000 to £200,000 a year. Actually they had had more than that.

Replying to the toast, Councillor M'Queen, Convener of the Renfrew Gas Committee, said that Renfrew would now be able to produce a steadier quality of gas in greater quantities, and at a very much cheaper rate. They hoped to wipe-out the capital expenditure in a very few years.

Provost Ferguson's services in the chair were acknowledged on the call of Mr. John W. M'Lusky, Manager of the Glasgow Corporation Gas Department.

On the morning of Oct. 27, at Middle Street, Driffield, Mr. and Mrs. W. H. Hammond and their infant grandchild, who was sleeping in their bedroom, his own parents being in another part of the house, were found unconscious, suffering from gas poisoning. There was a small gas fire; and it is stated there was no proper exit for the fumes. Mrs. Hammond evidently had been disturbed, and was found on the floor. Medical aid was secured, and by artificial respiration recovery was effected.

PRIMITIVA GAS COMPANY OF BUENOS AIRES, LTD.

A Brighter Outlook.

The Twenty-Third Annual General Meeting of the shareholders in the Company was held at River Plate House, Finsbury Circus, London, E.C., on Tuesday of last week—Mr. H. E. JONES (the Chairman) presiding.

THE LATE CHAIRMAN.

The CHAIRMAN, at the outset of the proceedings, said they were meeting on a very solemn occasion, for they had lost, by unforeseen and untimely death, their late Chairman, Sir Albert E. Bowen, Bart. He felt sure the shareholders would mark their sense of this great loss by rising in their places; and they would probably be disposed to confirm the message already sent by the Board of condolence and sympathy with Lady Bowen and the family in their bereavement. A very powerful and very active figure had suddenly disappeared from their counsels, and the Board had referred in their message to the great services rendered to the Company by Sir Albert, and their sincere regret at his sudden death. The Directors, indeed, received with the deepest sorrow the sad news. The late Chairman, besides being thoroughly acquainted with all Argentine customs and ways of business, was a most energetic, clear-headed, and outspoken man, and a favourite with all of them; and, speaking personally, any feeling that he might have in taking up the position which Sir Albert had held in the Company, and to which his (the speaker's) colleagues had unanimously elected him, was impaired by the consciousness that he could hope neither to accomplish what Sir Albert's gifts enabled him to do nor to claim the confidence of the shareholders to the extent that he had enjoyed it.

The shareholders signified, by silently uprising, their approval of the message to which the Chairman had referred.

The SECRETARY (Mr. Robert Grant) then read the notice convening the meeting and the report of the Auditors; and the report of the Directors [*ante*, p. 346] and statement of accounts for the year ended Dec. 31, 1923 were taken as read.

The CHAIRMAN, proceeding to move the adoption of the report and accounts remarked that first of all he would deal with the changes they had had to make in the staff of the Company. Having regard to the very concentrated method the late Chairman had of doing the business of the Company, it became at once obvious to him (Mr. Jones) that he could not possibly hope to follow in his steps; and therefore, when he was appointed, he relinquished part of the remuneration, and this part was dealt with in the following way. Recognizing the necessity for the almost daily attendance which Sir Albert made at the office of the Company, someone had to be found who was capable of taking up the assiduous duties which he had so well performed; and this being so, the Directors felt they could not do better than avail themselves of the services of their late Secretary, Mr. J. M. Macmorran, by appointing him to a seat on the Board, and making him Managing Director, so as to ensure absolute continuity of the system. ["Hear, hear."] Mr. Macmorran, of course, possessed a thorough knowledge of the Company's concerns, and was also familiar with the Argentine. The course adopted also enabled the Directors to give promotion to Mr. Grant, who had for a long time been the Company's Chief Accountant and Book-keeper, and had assisted the late Secretary. Mr. Grant had, like some of the other members of the staff, gone for many years with very little requital for his services; and besides giving him an advance in his remuneration, the Directors (while studying economy in every way) had been able to follow the same plan with regard to some of the junior officers. In this way the money, so far as the Company had it, would go into more pockets, and justice would be done to some of their old servants. Both Mr. Macmorran and Mr. Grant had served the Company faithfully and devotedly through many years of great strain and anxiety arising from the hard times they had experienced through the war and since. The "peace" may have been a very good figure of speech, but it had done very little to assist commercial undertakings in any shape or form. The Board were ever mindful of the need for the strictest economy, and intended to consider, among other things, a possible reduction of the London expenses, including perhaps the letting of part of the offices.

REPAIRS AND RENEWALS.

Coming to the accounts, it would be seen that that they showed a loss on the year's working of something over £2000; but when he told them that not only was it necessary to have a change of management, but that the plant had been found to be suffering very much from want of repair and renewal (because the profit that had been shown before would not, he regretted to say, have been shown had the works been maintained as one would have wished them to be, and as the new management insisted upon their being), they would not be surprised, at the receipts being £2000 short of the expenses. In his last speech to the shareholders, Sir Albert Bowen had said that he expected great things from the change of management. Well, they had with them in the room now the new member of their Local Board, Mr. Bernard F. Browne. The Directors were very lucky indeed to have had an opportunity of conferring with him on the affairs of the Company at the outset of his taking-on this responsibility. He was a most successful administrator of the gas, tramways, electricity, water, and other great works at Santos, and, though near in a sense to Buenos Aires, was still a thousand miles away up the coast; but he was called in by the late Chairman, and he (the speaker) might claim something himself for his selection. Mr. Browne was a very old friend of his. He was trained under the South Metropolitan Gas Company, and went out on his (Mr. Jones's) appointment to the old Primitiva Gas Company to look after their works. He, however, left them on the amalgamation, as he thought a reduction of the staff would necessarily follow. Since his retirement from the old Primitiva Company, he had been doing extraordinarily good work at Santos. Really, he (the speaker) had some hand in his going there, because one of the Directors, Mr. A. F. Phillips, who unhappily died recently, told him he wanted someone, and he replied that he would find such a man as he needed in Mr. Browne, who had right royally justified this selection. They would

have liked to get him away again, but it appeared that Mr. Browne who had a high sense of duty, was wedded to Santos, where they earned good profits, and charged a very low price for gas; and he had also entered into other professional engagements, which made it impossible for him to leave. He had, however, consented to join their Local Board, and the Company had much to be thankful for in having induced him in this way to come to their assistance. Being in this country, he had urged upon the Directors improvements which he considered necessary. He had been the author of considerable expenditure since his appointment, in the direction of stopping leakages and improving the efficiency of the carbonizing plant. The Directors had already sent out a section of new plant, though not by any means enough to effect all that Mr. Browne considered essential to put their profits on a satisfactory basis.

GAS MANUFACTURING DIFFICULTIES.

But at the present time the Company were suffering chiefly from the loss of consumers. During the war it became necessary to make gas from all sorts of materials—wood, straw, and even bran, were utilized for this purpose. The price of coal was enormous, and freights were even worse.

Mr. MACMORRAN pointed out that the Government fixed the freight at £6 6s. 6d. per ton of coal, which they had to get from America, and it was very poor stuff. Some of it cost up to £12 a ton.

The CHAIRMAN (continuing) said they might have shut-down the works, but in that case everything would have deteriorated very much; and the Board felt—bitter as the experience was—that the only thing to do was to "keep the pot boiling," for it had to be remembered that there were certain penalties attaching to their contract with the Municipality, and some of them had been put into force as it was. The last time the late Chairman was in the Argentine, he settled some of these matters; but the Company had had to pay their "pound of flesh," because, throughout, the Municipality had driven very hard bargains. Instead of thanking the Company for the enormous sacrifices they had made in producing gas costing ten times what they paid for it, they continued to exact penalties; and if the works had been shut down, it might have meant that they would have confiscated the undertaking. Now, however, he was pleased to say, they were recovering their consumers. Previously they were discontented, but this was understandable, because they had been having gas which was deficient both in quantity and quality. At the same time, the electric light people, of course, did not suffer in the same way from the price of coal, and so went ahead.

GAS NEED NOT FEAR ELECTRICITY.

One could not make "bad" electric light—the current was either generated or it was not. But people never got an adequate heating effect from electricity; and this reflection gave Mr. Browne and the Board great confidence in the future. Everywhere throughout the world to-day people must have gas, as an aid both in the home and in industry. Speaking as a scientist he told them that electricity could not supply this need; and why? He did not want to kindle any false hopes in their minds, but he would point out that quite recently, at the meeting of the British Association, a great authority on electricity—perhaps the highest authority in this kingdom on the side of electrical engineering—said that even now, with up-to-date steam plant and gas-filled lamps, for electricity the over-all efficiency from coal to light was not equivalent to more than 40 lbs. weight of each ton of coal used. He stated that the real blame must be put on the steam engines. But if they had not this recent testimony, there was the report made some years ago by Sir Dugald Clerk, F.R.S., together with Professors Smithells and Cobb, that the average of the electricity stations of the United Kingdom gave, for every 100 heat units expended by combustion of coal for the generation of electricity, only 7.6 p.ct. On the other hand, in their own industry, for every 100 heat units expended by carbonization of coal, 45 were conveyed to the consumer in the form of gas. This was the foundation of his confident hope in the future of gas; and it must be remembered that they had a monopoly of gas supply in Buenos Aires. At present they had only 34,000 consumers out of a population of 1,750,000. As a matter of fact, when war broke out they were selling twice as much gas as was the case to day, and the proportion of leakage—which never was low—had, of course, increased accordingly. What they had now to do was to win back the confidence of the consumers, and to do this it was essential to reduce the price of gas by the practice of economies in the production of it. He had himself in the course of his life done an enormous amount of work in connection with gas all over this country, as well as in India and France, and had never known dear gas to be successful. Great as was its convenience, it had to be reasonable in its price; and this was what they must aim at. There was already a substantial improvement in the business, and prospects promised still better things; but unfortunately there remained the obligation to repair and renew the plant. It was regrettable that the late management called that "profit" which should have been money spent on the undertaking, and left things to the new management in a very dilapidated condition. He did not want to cast too much reproach on the late management in the matter, because when one had to carbonize such extraordinary materials as he had mentioned, the effect must be more destructive on the plant than the ordinary wear and tear of a gas-works. This was another of the back kicks that the war had given them. The gas sold during the first nine months of this year showed an increase of 2,122,303 cubic metres, which was equal to more than 10 p.ct. If the manufacturing charges of last year, £322,725, were compared with the £253,045 of the previous year, it would be seen that this difference alone accounted for their having something like £70,000 less than they would have had but for the increase. This sum, however, had really had to be spent on excess repairs such as did not arise in a normal way, and would not arise with them when once things were put in proper order. The expenditure had been due to the neglected condition of the works following the war and the years of peace which had been almost worse than the war. The new Manager (Mr. E. P. Stevenson) came of a family of good gas men, and they might have full confidence that he would soon put the undertaking on a better footing. He concluded by moving the adoption of the report and accounts.

Mr. C. P. OGILVIE, seconding the resolution, referred (as did subsequent speakers) to the magnificent work done for the Company by the late Chairman, and said he was only sorry that Sir Albert was not with them that day, to see that success was at any rate within their reach. They were now on the right road. The working results of the first nine months of last year showed a profit of £32,000, while for the same period of this year the profit was £79,000. The gas supply was good, and consumers were coming back by the score.

After a short discussion, the resolution was carried unanimously.

Thereafter Mr. H. E. Jones was re-elected a Director, and the meeting confirmed Mr. Macmorran's appointment to the Board. The Auditors (Messrs. George A. Touche & Co.) were also re-appointed.

MR. BROWNE'S VIEWS.

Mr. BERNARD F. BROWNE, replying to a vote of thanks to the officers and staff said it was a very great pleasure to feel that he might again become useful to his first love. Over 22 years ago, Mr. Jones sent him to the old Primitiva Gas and Electric Light Company, and, human vanity being what it was, he was extremely gratified at being again invited to assist at the councils of the reconstituted Company. Mr. Ogilvie had pointed out that the profits for the first nine months of this year showed an increase of 146 p.ct.; but this, of course, was nothing like sufficient to produce a reasonable dividend upon the investment of the shareholders. The extra gas they had sold had not cost a penny to produce; it had merely been prevented from disappearing in any of those directions termed "unaccounted-for gas." The accounts which were before them that day were the result of trading conditions which were now ten months behind them. Cheaper gas must be produced if they were to return to reasonable profits, and their efforts were therefore being turned to the cheapening of production in a radical way. The capital had been reduced, but the reduction had not provided them with any additional money with which to finance the rehabilitation of the Company. He was not the least bit sceptical about the result of their efforts, and, in view of the importance of justifying at the earliest possible moment the confidence and forbearance of the shareholders, it had been decided to go "the whole hog," and to instal the most efficient and economical system of gas manufacture known to-day. The staff in Buenos Aires were all that could be desired, and were imbued with the spirit of the late Chairman: "You may take it from me that we will pull this Company round."

The proceedings concluded with a vote of thanks to the Chairman and Directors for their services.

PREVENTING GAS MAIN ACCIDENTS.

Bulletin No. 1 of the Accident Prevention Committee, American Gas Association.

Recent accidents have demonstrated the necessity of taking detailed precautions when making repairs or changes of any kind to gas mains. Where a reasonable amount of care is taken, such work is not accompanied by any undue hazard; but as in all other operations where gas is involved, certain fundamental rules must be observed. The most essential of these are as follows:

PLANNING THE WORK.

1.—The man in charge should, in cases of complicated shut-down, tabulate in advance, in writing, the proposed operations in their exact sequence, including the proper manipulation of all valves and all changes in piping or equipment.

2.—This tabulation should be checked independently by others, preferably by the superior in charge, and an approved schedule of operations should be prepared and agreed upon by those responsible, who will sign the orders as an indication of complete understanding.

3.—To be prepared for any possible emergency, a diagrammatic sketch or lay-out of the existing lines and control valves should be available right at the point of operation. Special note should be taken as to the direction in which the various valves turn, and of the number of turns necessary to insure the complete closing of each valve.

EXECUTING THE WORK.

4.—The man responsible must follow the schedule implicitly and make certain that each operation has been properly performed before any openings are made in the mains.

5.—No openings other than bag or vent holes should be made in the mains until it is certain that the pressure is off.

6.—Under no consideration must valves be depended upon for absolute tightness, but bags, which, except in low-pressure mains less than 6 in. in diameter, must always be used in conjunction with stoppers, must be placed against all possible sources of gas, with adequate vents to carry away all gas seepage. The amount of dead gas between the work and the point where gas is shut off—whether this point be a valve or a stopper—must in all cases be reduced to a minimum by adequate venting. The vent which must be maintained should be covered with a fine gauze screen at the discharge end, which discharge must be carried well above the heads of the men.

7.—When blank flanges are to be removed from lines which may have been under pressure, the bolts should first be slacked off and the flange carefully chiselled apart. No further work should be performed until it is made certain that there is no dangerous passage of gas through this aperture.

8.—Where the continuity of the main is broken, or where a new connection is made, a bond wire should be installed to conduct any electric current which may be carried by the main, and so prevent a spark which might ignite any accumulation of gas.

9.—When finally closed, no valve must be touched until the work is completed, and then must be opened only on the express order of the man in charge after he has personally assured himself that all work is perfectly gas-tight and safe.

GENERAL PRECAUTIONS.

10.—Where work is to be done in confined places, such as basements or vaults, proper gas masks must be used, and in any case these must be immediately available for use in emergencies.

XUM

NORTH-EAST COAST COAL TRADE.

From our Own Correspondent.

The prevailing sentiment on the market after the excitement of the General Election is one of hopefulness. It is realized that no immediate improvement in conditions can reasonably be expected on any considerable scale. But it is hoped that, by the restoration of confidence which is looked for, trade at home and on the Continent will call for more coal. It is especially to the iron and steel trades at home that the coal trade is looking for increasing demand. If this, or some other outlet, does not develop, it is realized that prospects for the beginning of next year are very poor indeed. It is only the higher-priced contracts which are still running till the end of this year that enable many collieries to continue to take current prices; and, as an example of what is happening, another large company has this week given notice of the probable closing at an early date of more of its pits.

There has been a certain amount of inquiry, in a good many instances for delivery from April next year. Perhaps this implies that shrewd buyers anticipate an improvement at that date at the earliest. In any case, most collieries are not willing to quote as low as current rates for so far ahead as that.

Gas coals have remained fairly steady at about previous levels, and are still much better than other Durham unscreened sorts. Wear specials are quoted 21s. 6d. to 22s. f.o.b., best qualities 20s. 6d. to 21s., and seconds 17s. 6d. to 18s. These prices, at any rate for specials and bests, can often be discounted for early shipments, best qualities having been done during the week at 20s.

COAL TRADE IN THE MIDLANDS.

From our Local Correspondent.

There are a good many spot lots of gas coal and other qualities on offer at the collieries; but though the prices named are tempting, the unreceptive state of the market restricts business. Gas-works are taking their contract supplies steadily. With the normal increase of consumption as the season advances, the market has a little more play; but there is no perceptible improvement in the demand for gas for industrial purposes. The assurance of an effective preponderance of parliamentary power on one side of the scale is taken as a good augury for trade expansion. It is too early yet for the new position to have crystallized, however. Market conditions have been indeterminate. Some of the pits which were under steady pressure as long as the replenishment of stocks was in progress are now "playing" one day a week. Full production has become the exception.

At this season of the year collieries are pretty safe in putting down stocks within limits. A certain number of them are drawing coal in excess of current demand where they have suitable facilities for carrying reserves; but considerations of finance are a conditioning factor where this policy is under consideration. Demand for the highest grades of household coal is fully sustained. Pits producing them have sold their output in some cases for six or seven weeks to come. Values are consequently strong. In medium grades the trade has fallen off quite appreciably. There is only a slow sale for industrials. D.S. nuts, beans, and slacks can be picked up at cheap rates. An easy tone prevails in coke.

YORKSHIRE AND LANCASHIRE COAL TRADE.

From our Local Correspondent.

The coal trade of Yorkshire and Lancashire has been considerably influenced by the General Election, particularly in regard to export. There is no improvement in the demand from abroad for English fuels; but it is anticipated that when the Dawes scheme is in full working order there will be an improvement in regard to supplies from this country.

The outlook for the trade in industrial coal during the next two or three months is rather dull; but the general feeling is that in the early part of next year there will be more normal conditions. In Lancashire the prospects are a little better. More work is expected at the cotton mills; and this should make a difference in the demand for slacks. Gas coals in the open market are weak, although collieries report that contracts are being dealt with satisfactorily. By next month the present position will most likely have been relieved.

House coal is not in urgent request at the moment, possibly because many householders obtained large stocks in view of the anticipated advance on Oct. 1, and also because the weather remains fairly mild.

Prices at Hull at the week-end were: Bunkers—Yorkshire, Derby, and Notts large screened steam, f.o.b. Humber ports, 17s. to 21s. Cargo for export, f.o.b. usual shipping ports—Best Yorks hards, Association, 23s. to 23s. 3d.; Derby best hards, 24s. 6d. to 25s. 6d.; West Yorks Hartleys, 20s. to 23s.; South Yorks washed doubles, 18s. 6d. to 19s. 6d.; South Yorks washed singles, 18s.; dry doubles, 14s. 9d. to 16s. 6d.; South Yorks washed smalls, 15s. to 15s. 6d.; Derby slack, 1 in., 10s.; South Yorks rough slacks, 10s. to 10s. 6d.; gas coke, 30s. to 36s.; foundry furnace coke, 19s.; washed smithy peas, 21s. 6d. to 26s.; washed steam thirds, 19s.; South Yorks washed trebles, 22s. per ton.

Fatality at Dundee Gas-Works.—As a result of a hoist accident at the Dundee Gas-Works last week, George Anderson, a fireman, was so severely injured that he died while medical aid was being summoned. It is supposed that Anderson had looked over the tie-bars to see who was ascending in the elevator, when he was struck by the hoist weight.

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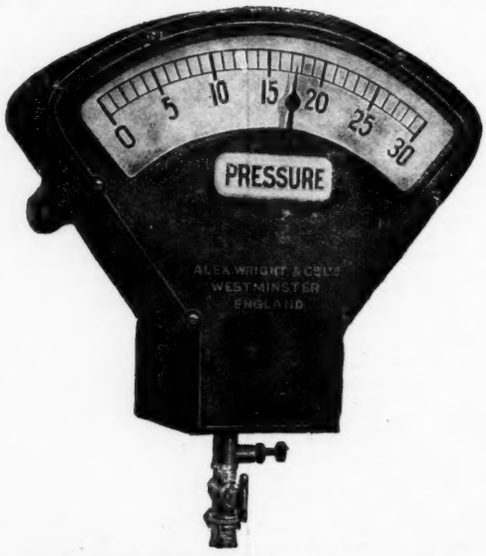

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CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Nov.* 3.

In the London market pitch remains without material change. There is a firmer tone about the market, although little business is reported. Makers' idea of price is something over 50s. per ton. There is more demand for creosote, and the market is firm at from 6¼d. to 6½d. per gallon. Pure toluole is about 1s. 9d. per gallon; 95/160 solvent naphtha about 1s. 6d. per gallon; pure benzole about 1s. 7d. per gallon, and supplies are scarce. Other products are without change.

Tar Products in the Provinces.

Nov. 3.

There is very little alteration in the market for tar products. Pitch continues firm; but there appears to be hardly any business doing. The Continent are not buyers at the present for this year's delivery, and seem to think that by waiting they will do better for delivery for January-April. Continental pitch is still being offered at less than 50s. per ton delivered to the consumers' works. Small parcels of pitch have been sold on the East Coast at 42s. 6d. to 43s. Creosote is unchanged; but there appears to be an opinion that, after the turn of the year, there may be some improvement in the price. Water-white products remain steadier, and the market for solvent naphtha is decidedly firm. The remaining tar products are quiet, and business is difficult to negotiate.

The average values for gas-works products during last week were: Gas-works coal tar, 27s. to 32s. Pitch, East Coast, 42s. 6d. to 45s. f.o.b. West Coast—Manchester, 37s. 6d. to 40s.; Liverpool, 38s. 6d. to 41s.; Clyde, 41s. to 42s. Benzole 90 p.ct., North, 1s. 2d. to 1s. 3d.; crude 65 p.ct. at 120° C., 9¼d. to 10d. naked at makers' works; 50-90 p.ct., naked, North, 1s. 2d. to 1s. 3d. Toluole, naked, North, 1s. 3d. to 1s. 4d., nominal. Coal tar crude naphtha in bulk, North, 7d. to 7½d. Solvent naphtha, naked, North, 1s. 2d. to 1s. 4d. Heavy naphtha, North, 1s. 1d. to 1s. 2d. Creosote, in bulk, North, liquid, 5d. to 5¼d.; salty, 5d. to 5½d.; Scotland, 5d. to 5½d. Heavy oils, in bulk, North, 6¾d. to 7d. Carbolic acid, 60 p.ct., 1s. 7d. to 1s. 8d. prompt. Naphthalene, £13 to £15; salts, £4 to £7, bags included. Anthracene, "A" quality, 3½d. per minimum 40 p.ct., purely nominal; "B" unsaleable.

The London Office of "Combustion" has been removed from Aldwych House to Africa House, Kingsway, W.C. 2, and the General Representative is Mr. E. Kilburn Scott, A.M.Inst.C.E. The paper gives special attention to all matters connected with the combustion of fuels and the generation of power. Arrangements are being completed for the simultaneous publication of the journal in London, Paris, New York, and Berlin.

CONTRACTS OPEN.

The Gas and Water Department of the Borough of East Retford are inviting tenders for new carbonizing plant comprising retort bench, chimney, foundations, &c., coal-handling plant, combined charging and discharging machine, coke machine, and electrical generating set. [See advertisement on p. 373.]

In connection with their proposed new gas-works at Partington, the Manchester Corporation Gas Committee are inviting tenders for a four-lift spirally-guided gasholder with steel tank, and also the construction and erection of concrete coal bunkers, retaining walls, abutments and bridges, &c. [See advertisement on p. 373.]

Extensions.

The Dewsbury Town Council, on Oct. 30, approved a recommendation of the Gas Committee to seek power to borrow £34,850 for the installation of horizontal retorts and coke-handling plant at the Corporation gas-works, and to ask for a grant-in-aid from the Unemployment Grants Committee.

TRADE NOTES.

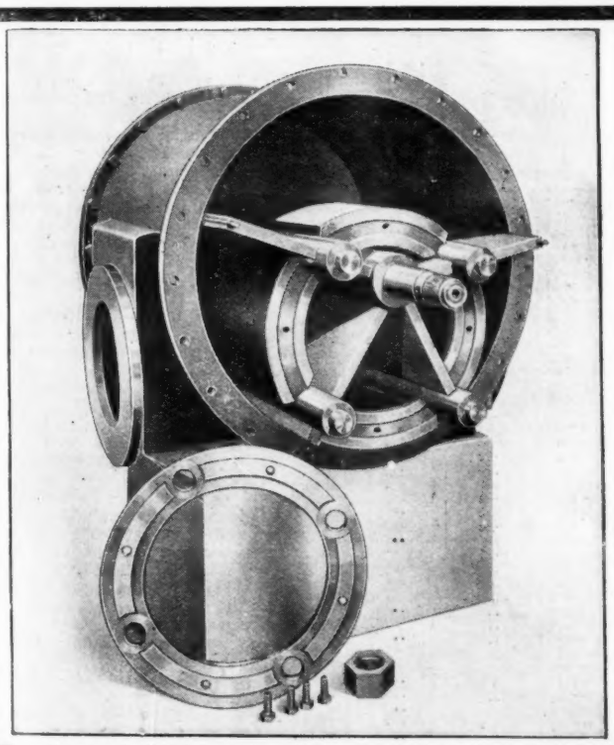
Boosting and Exhausting Fans.

The many excellent features of the boosting and exhausting fans manufactured by Messrs. James Keith & Blackman Company, Ltd., No. 27, Farringdon Avenue, London, E.C. 4, are well described in a neat booklet which we have just received from the firm.

The Woodall-Duckham Companies.

Recently the Woodall-Duckham Vertical Retort and Oven Construction Company (1920), Ltd., have published some excellent pamphlets descriptive of their work. The latest publication gives a general idea of the Woodall-Duckham Companies, and deals with continuous vertical retorts, inclined chamber ovens, intermittent vertical chamber ovens, the Becker coke oven, the treatment of coals before carbonization, and the treatment of bye-products. It shows how the Woodall-Duckham Companies have during the last twenty years worked to gain knowledge of fuels in their raw state and to convert them into such forms as will give heat, light, and power to the community efficiently and hygienically under conditions requiring minimum labour.

A Picturesque Calendar.—In connection with the Smoke Abatement Exhibition which is being held at Manchester this week, the Woodall-Duckham Vertical Retort and Oven Construction Company (1920), Ltd., have issued a delightful calendar which depicts in a most convincing way the desirability of a clean and pure atmosphere.



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LATEST IMPROVEMENTS IN EXHAUSTERS.

R. & J. DEMPSTER, LTD., MANCHESTER.

London Office: 34, VICTORIA STREET, WESTMINSTER, S.W. 1.

STOCK MARKET REPORT.

ALTHOUGH members of the Stock Exchange had very definite views as to the result of the General Election, which was illustrated by the buoyancy of the market during the previous week, the most optimistic of them did not anticipate such a sweeping majority for the Conservatives. A good deal of speculation took place on the possible results, and there is a rumour that a certain section supporting the Liberals have had some heavy losses. The view is now taken that the enormous turn-over will have an excellent effect on the Stock Markets, and this was illustrated by the quick response both on stock prices and the value of international exchanges.

A settled Government commands universal confidence, and will undoubtedly attract foreign money. French Government bonds weakened on the announcement of the high terms which the French Government is offering for its internal loan. The bonds will bear interest at 5 p.ct., but will be repayable by drawings at a premium of 50 p.ct. between six and ten years, and on a bond redeemed as late as the tenth year the return to the investor will be over 8 p.ct.

War Loan, Funding, and the Conversion Loans were in great demand. In the Foreign Market, Austrian and Hungarian loans appreciated, while the new German Loan was steady at 5 premium.

It is not possible to indicate briefly the numerous features of the Industrial Market. Textiles, Cottons, Iron and Steel, Tobaccos, Mines, and to a modified extent, Rubber and Oil, all participated in the general optimism.

There were more transactions than usual in the Gas Market. It will be seen by the list below that the changes in the quotations were more numerous, and, with two exceptions, were on the upward grade.

The following transactions were recorded during the week:

On Monday, Brentford "A" 113½, "B" 112, Commercial 4 p.ct. 93, 3½ p.ct. 93, 94, 3 p.ct. debenture 57⅞, European 8½, Gas Light and Coke 93½, 93⅞, 94, 94⅛, 94¼, 4 p.ct. preference 79½, 80½, 3 p.ct. debenture 62, Hongkong and China 16, 16¼. Imperial Continental 174½, Montevideo 59½. Oriental 101¼. Primitiva 9s. 7½d., 9s. 9d., 10s., 4 p.ct. (Buenos Ayres) debenture 56½, San Paulo 5 p.ct. debentures 41½, South Metropolitan 99, 99½, 99⅞, 100, South Suburban 5 p.ct. 106½, Tottenham "B" 102, Wandsworth "B" 115. Supplementary prices, Aldershot 4 p.ct. debenture 75. Bath 5 p.ct. debenture 94, 94½, Broadstairs 10 p.ct. "A" 116, 116½, 5 p.ct. debenture 87½, 88, Oxford 5 p.ct. debenture 98¼, Wandsworth 3½ p.ct. new 100¼.

On Tuesday, Bournemouth "B" 12⅝. British 118, Continental Union 38, European 8⅝, 8⅝, Gas Light and Coke 93⅞, 93⅞, 94, 94¼, 94⅛, 94½, 3½ p.ct. maximum 62½, 4 p.ct. preference 80½, Imperial Continental 174½, 175, 176, Plymouth and Stonehouse 111, 112, Primitiva 9s. 3d., 9s. 6¾d., 9s. 9d., South Metropolitan 99⅛, 99⅝, 6½ p.ct. debenture 104, South Suburban 5 p.ct. 106½, 106⅝, 107½ Southampton 86, 86¾ 4 p.ct. debenture 76½. Supplementary prices, Bath 92, Colonial Gas Association 7 p.ct. preference 16s. 6d., Kingston-upon-Thames 104, 104½, Pinner 6 p.ct. preference 5⅝. South Suburban 7 p.ct. debenture 104.

On Wednesday, Aldershot 4 p.ct. preference 75, Alliance and Dublin 65⅛, 66, Brentford "A" 112½, "B" 112½, Bristol 91½, 92, Commercial 3½ p.ct. 94, 3 p.ct. debenture 57½, 58⅛, Continental Union 39, European 8¼, 8⅜, Gas Light and Coke 94, 94⅛, 94⅜, 4 p.ct. preference 79⅜, 80½, 3 p.ct. debenture 61½, Imperial Continental 174½, 175, Primitiva 9s. 3d., South Metropolitan 99¼, 100, 3 p.ct. debenture 60½, 60⅜, 6½ p.ct. debenture 104½, South Suburban 107½, Southampton 4 p.ct. debenture 77. Supplementary prices, Romford 7 p.ct. "B" 7⅛, South Suburban 7 p.ct. debenture 106.

On Thursday, Bombay 5 1/16 *ex* div., Brentford 4 p.ct. debenture 78½, Commercial 3½ p.ct. 93½, 93⅜, Continental Union 38, Gas Light and Coke 94, 94⅛, 94⅜, Montevideo 59½, 60, 60½, Oriental 101½, 102, Primitiva 9s. 0¾d., South Suburban 5 p.ct. 106⅜, Southampton 5 p.ct. 86½, 86⅝, Swansea 7 p.ct. preference 102⅜, Supplementary prices, Oxford 5 p.ct. debenture 99, Romford 7 p.ct. "B" 7 15/16.

On Friday, Brighton and Hove "A" 127, 127⅞, Commercial 4 p.ct. 93, 3½ p.ct. 93½, 93⅝, 94, Continental Union 40, European 8 7/16, Gas Light and Coke 94½, 94⅞, 94⅞, 95, 95⅛, 95⅜, 4 p.ct. preference 80, 80⅜. 3 p.ct. debenture 61½, Imperial Continental 174½, 175, 177, Primitiva 8s. 9d., South Metropolitan 99½, 100, 100½.

In Lombard Street, funds were again plentiful, supplies being augmented by over £1,700,000 of dividend distribution. Overnight accommodation was obtainable from 2½ p.ct. down to 2 p.ct. The average rate at which the Treasury Bills were allotted was £3 12s. 10·66d. p.ct., or 1s. 5d. below the rate for the previous week.

The improvement in the Foreign Exchanges brought about by the Election results received a slight check at the close of the week so far as "neutral" exchanges were concerned. The Swiss, Dutch, and Norwegian all moved downward. Allied currencies generally closed firm. Sterling on New York was at 4·59½, French francs at 86 17½, Belgian francs at 94 2½, and Italian lire at 104·5.

The Silver Market was dull as a result of Indian selling, the cash price falling to 34½d. per oz.

The Bank rate is 4 p.ct., to which it was raised from 3 p.ct. on July 5, 1923. Bankers' deposit rates are 2 p.ct. Those of discount houses are 2 p.ct. at call and 2½ p.ct. at notice.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr.	Dividends. Last Hf. Yr.	NAME.	Quotations. Oct. 31.	Rise + or Fall − on Week.	Transactions Lowest and Highest Prices.
£			% p.a.	% p.a.				
171,978	Stk.	Aug. 14	5	5	Aldershot 5 p.c. max. C.	80—83	..	..
235,492	"	"	4	4	Do. 4 p.c. Pref.	72—77	..	75
1,551,868	"	Sept. 25	6	6½	Alliance & Dublin Ord.	61—66	..	65⅛—66
374,000	"	July 10	4	4	Do. 4 p.c. Deb.	63—68	..	..
300,000	5	Oct. 23	8	8	Bombay, Ltd.	5—5⅛*	..	5 1/16
100,000	10	Aug. 14	8½	8½	Bournemouth 5 p.c.	12⅛—13⅛	..	..
383,110	10	"	7	7	Do. B 7 p.c.	12⅛—13	..	12⅛
150,000	10	"	6	6	Do. Pref. 6 p.c.	10⅞—11⅛	..	..
50,000	Stk.	June 26	3	3	Do. 3 p.c. Deb.	54—59	..	..
162,025	"	"	4	4	Do. 4 p.c. Deb.	74—79	..	..
992,045	"	July 10	6 1/16	6 1/16	Brentford A Con.	110—115	..	112½—113½
990,500	"	"	6½	6½	Do. B New	110—115	..	112—112½
76,000	"	"	5	5	Do. 5 p.c. Pref.	87—92	..	..
306,690	"	June 12	4	4	Do. 4 p.c. Deb.	75—80	..	78½
181,337	"	"	—	6	Brighton & Hove Orig.	100—105	..	..
214,740	"	Aug. 28	11½	11½	Do. A Ord.	170—175	..	..
244,200	"	"	8½	8½	Bristol 5 p.c. max.	125—126	..	127—127½
1,287,500	"	July 24	5	5	British Ord.	92—93d	+1	91½—92
855,000	"	Sept. 25	7	8	Do. 7 p.c. Pref.	115—120	..	118
100,000	"	June 26	7	7	Do. 4 p.c. Red. Deb.	118—123	..	..
120,000	"	"	4	4	Cape Town, Ltd.	72—77	..	..
100,000	10	May 22	6	8	Do. 4½ p.c. Pref.	6—7	..	..
100,000	10	Apr. 24	4½	4½	Do. 4½ p.c. Deb.	71—76	..	..
100,000	Stk.	June 26	4½	4½	Cardiff Con. Ord.	97—100	..	..
150,000	"	July 24	6	6	Do. 7½ p.c. Red. Deb.	103—106	..	..
626,860	"	June 26	7½	7½	Chester 5 p.c. Ord.	86—91b	..	..
237,860	"	Aug. 14	6½	5	Commercial 4 p.c. Cap.	92—95	+1	93—94
157,150	"	July 24	6	6	Do. 3½ p.c. Cap.	92—95	+1	93—94
1,513,280	"	"	6	6	Do. 3 p.c. Deb.	56—59	..	57½—58½
560,000	"	June 12	3	3	Continental Union, Ltd.	38—43	..	35—40
475,000	"	14 Jan. 15	—	—	Do. 7 p.c. Pref.	87—92	..	..
800,000	"	June 12	7	7	Croydon sliding scale	101—104	+1	..
200,000	"	Aug. 28	6½	6½	Do. max. div.	84—87	..	..
660,000	"	"	5	5	Derby Con.	107—110	..	..
284,975	"	Aug. 28	9	6	Do. Deb.	74—76c	..	..
492,270	"	July 10	4	4	East Hull 5 p.c. max.	—	..	..
55,000	"	Oct. 9	5	5	European, Ltd.	8—8½	+½	8 7/16—8 7/16
209,000	"	July 24	2	6	Gas Light & Coke 4 p.c. Ord.	94—96	+½	93⅛—95⅛
1,002,180	10	Aug. 14	5⅓	5⅓	Do. 3½ p.c. max.	61—64	..	62½
16,503,045	Stk.	"	3½	3½	Do. 4 p.c. Con. Pref.	78—81	..	79½—80⅛
2,600,000	"	"	4	4	Do. 3 p.c. Con. Deb.	60—63	..	61½—62
4,062,235	"	June 12	3	3	Do. 10 p.c. Bonds	..	..	..
4,761,930	"	"	10	10	Do. 7½ p.c. Ilford Deb.	..	..	..
130,000	"	—	7½	7½	Hastings & St. L. 5 p.c. Conv.	95—100	..	..
42,000	"	—	6½	6½	Do. 3½ p.c. Conv.	75—80	..	16—16½
82,500	"	Sept. 11	5½	5½	Hongkong & China, Ltd.	15½—16½	..	..
258,740	"	"	10	10	Hornsey 7 p.c.	138—143	..	174½—177
70,000	10	Sept. 25	10	10	Imperial Continental Cap.	173—178	+1	..
86,600	Stk.	Aug. 14	10	30	Do. 3½ p.c. Red. Deb.	68—72	..	..
1,976,000	"	May 22	3½	3½	Lea Bridge 5 p.c. Ord.	95—100	..	..
263,950	"	Aug. 14	6½	6½	Liverpool 5 p.c. Ord.	90—91b	−1	..
235,242	"	Aug. 14	5½	5½	Do. 7 p.c. Red. Pref.	102—105b	..	..
2,127,340	"	Sept. 25	7	7	Maidstone 5 p.c. Cap.	120—125	..	..
600,000	"	Aug. 28	8	9	Do. 3 p.c. Deb.	53—58	..	..
165,736	"	June 26	3	3	Malta & Mediterranean	3½—3¾	..	..
63,480	"	"	5	7	Montevideo, Ltd.	58—61	+2	59½—60½
75,000	5	June 12	4	4	Newcastle & Gateshead Con.	82½—83½d	..	83
541,920	Stk.	July 24	5½	5	Do. 4 p.c. Pref.	74—75d	..	..
1,875,892	"	"	4	4	Do. 3½ p.c. Deb.	69—71d	..	70
250,166	"	June 26	3½	3½	North Middlesex 10 p.c.	15½—16½	..	..
529,705	"	Aug. 28	11	11	Do. 7 p.c.	11½—11⅞	..	..
15,000	10	"	7 7/10	7 7/10	Oriental, Ltd.	99—102	..	101½—102
75,940	10	May 8	9	7	Plym'th & Ston'house 5 p.c.	112—117	..	111—112
300,000	Stk.	June 26	7¼	7¼	Portsea Island B	99—102	..	..
138,120	"	Aug. 28	13	13	Do. C	95—100	..	..
60,000	50	"	12	12	Primitiva Ord.	8/6—9/6	..	8/9—10/0
100,000	50	"	—	—	Do. 4 p.c. Red. Deb.	76—79	−1/0	..
2,289,909	1	June 2	4	4	Do. 4 p.c. Red. Deb. 1911	57—62	..	..
341,400	100	July 24	4	4	Do. B. Aires 4 p.c. Rd. Db.	57—62	+2	56½
600,000	Stk.	June 26	4	4	Do. R'r P'te 4 p.c. Rd. Db.	57—62	+2	..
220,335	"	"	4	4	San Paulo 6 p.c. Pref.	6½—7½	+2	..
321,670	"	Sept. 25	6	6	Do. 5 p.c. Red. Deb.	41—43	..	41½
150,000	10	July 1	5	5	Sheffield A	103—105e	..	..
125,000	50	Aug. 28	5/8/4	5½	Do. B	103—105e	+2	..
270,000	Stk.	"	5/8/4	5½	Do. C	103—105e	+2	103½
419,968	"	"	5/8/4	5½	South African	7—9*	..	..
1,047,000	10	Oct. 23	8	6	South Met. Ord.	99—101	..	99—100½
90,000	Stk.	Aug. 14	6½	5	Do. Red Pref.	98—100	+½	..
6,609,895	"	July 10	5	5	Do. 3 p.c. Deb.	59—62	..	60½—60⅞
102,580	"	"	3	3	Do. 6½ p.c. Red. Deb.	103—105	..	104—104½
1,895,443	"	Sept. 11	6½	6½	South Shields Con.	134—137d	..	..
734,000	"	Aug. 28	8½	8½	South Suburban Ord. 5 p.c.	105—108	..	106½—107½
91,500	"	Aug. 14	6½	6½	Do. 5 p.c. Deb.	93—98	..	..
1,087,795	"	June 26	5	5	South'mpt'n Ord. 5 p.c. max.	85—88	..	86—86½
368,837	"	May 8	5	5	Do. 4 p.c. Deb.	7½—78	..	76½—77
647,740	"	June 26	4	4	Swansea 7 p.c. Red. Pref.	102—104	..	102½
121,275	"	Aug. 28	7	7	Do. 6½ p.c. Red. Deb.	102—104	+½	..
250,000	"	June 26	6½	6½	Tottenham District A 5 p.c.	116—119	..	..
200,000	"	July 24	8	8	Do. B 3½ p.c.	1·0—103	..	102
120,000	"	"	6½	6½	Do. 4 p.c. Deb.	76—80	+1	..
882,275	"	"	4	4	Tynemouth Con. and New	84—86d	..	..
181,255	"	June 12	7/14/4	5	Wandsworth, Wimbledon, and Epsom—		..	..
258,251	"	Aug. 28			Wandsworth A 5 p.c.	135—140	..	115
					Do. B 3½ p.c.	113—118	..	..
30,000	"	July 10	9½	9½	Do. C	96—101	..	100½
255,636	"	"	7½	7½	Do.	..	..	..
108,075	"	"	6/7/9	6/9/6	New Ordinary	110—115	..	..
240,865	"	"	6/7/9	6/9/6	Wimbledon 5 p.c.	113—120	..	..
352,000	"	"	7½	7½	Epsom 5 p.c.	55—60	..	..
98,000	"	"	7½	7½	3 p.c. Deb.			
88,416	"	June 26	3	3				

Quotations at:—*a*.—Bristol, *b*.—Liverpool. *c*.—Nottingham. *d*.—Newcastle. *e*.—Sheffield. * Ex. div.

Low-Temperature Carbonization.—At a recent meeting of the Stoke-on-Trent Gas Committee, Mr. Sharpley, the Town Clerk, submitted a letter from Messrs. Kerr, Stuart, & Co., Ltd., offering to supply gas in bulk to the Corporation at 10d. per 1000 c.ft. It was decided that the Town Clerk should make further inquiries into the matter, and that the question should be discussed at a special meeting of the Committee, subsequent to an inspection of the low-temperature carbonization plant at Barnsley.

Dempster-Toogood Verticals for Hebden Bridge.—It was stated on p. 300 of last week's "JOURNAL" that the Hebden Bridge and Mytholmroyd Gas Board had decided to make application to the Ministry of Health for sanction to borrow £9600, in order to add a unit of Dempster-Toogood vertical retorts to the existing installation. The paragraph went on to say that, "provided their tender proves satisfactory, Messrs. Robert Dempster & Sons, Ltd., will carry out the work." Of course, Messrs. Dempster's price has proved satisfactory to the Board; hence their application to the Ministry of Health for a loan for the proposed extension.

A Prepayment Meter which Ceased to Register.—An application under section 20 of the Gas-Works Clauses Act was made last week by the Newcastle-upon-Tyne and Gateshead Gas Company to the local Justices for their decision on a estimated consumption of gas. A prepayment meter had ceased to register the gas passing through it, and at the same time the prepayment mechanism failed to act; the valve remaining open, permitting the gas to be obtained without the coin being placed in the box. An estimate based on the consumption of gas over the same period during four previous years was submitted to the consumer, who would not consider it, and refused to pay anything. The Justices decided that the estimated consumption was fair and reasonable, and made an order for payment of the amount estimated, with costs against the consumer.

The Directors of the Continental Union Gas Company, Ltd., announce that it is proposed to pay, on Jan. 2 next, a final dividend of 3½ p.ct., less tax, on the preference stock, making the full 7 p.ct. for the year ended June 30 last.

The Directors of the Montevideo Gas and Dry Dock Company, Ltd., have declared an interim dividend on the ordinary stock for the half-year ended June 30 last, of 2 p.ct. (actual), free of income-tax, payable on Dec. 1. This is the same as in the previous year.

Presentation at Swansea.—A presentation was made at the Oystermouth Road Works of the Swansea Gas Light Company last Friday on the retirement of Mr. George Dean, who has occupied the position of general foreman to the Company for 34 years. Mr. Dean was the recipient of an inscribed umbrella and a wallet of Treasury notes; and a handbag was presented to Mrs. Dean. The high esteem and universal respect in which Mr. Dean is held were expressed by a representative gathering of employees; and Mr. W. H. Johns, the Engineer and Manager, who presided, congratulated him upon his loyalty to the Company over such a long period of unbroken service. Mr. Ernest Ablett (Secretary and Assistant Engineer) supported Mr. Johns; and Messrs. F. Andrews, H. Brown, and A. W. Jones also congratulated Mr. Dean.

Results at Ellesmere.—The annual statement of the Ellesmere Port Gas Committee for the year ended March 31 shows that the quantity of gas made was 66,137,700 c.ft., as against 65,856,000 c.ft. for the preceding year. The quantity of gas sold and accounted for was 59,297,500 c.ft., as compared with 60,676,650 c.ft. The gross profit amounted to £5687; and after providing £3784 for interest and £2861 for sinking fund contributions, there was a net loss of £958 on the year's working, compared with a loss of £870 for the previous year. The capital expenditure upon the gas undertaking was £81,031; and towards this sum £17,976 had been paid into the sinking fund for the redemption of such capital. From the sinking fund, loans had already been redeemed to the extent of £4777, and £13,180 had been invested with the Council for other purposes at reasonable rates of interest.

Wandsworth Gas Capital Issue.—By order of the Directors of the Wandsworth, Wimbledon, and Epsom District Gas Company, Messrs. A. & W. Richards are offering for sale by tender £280,000 new capital, comprising £150,000 4 p.ct. debenture stock, £100,000 5 p.ct. preference stock, and £30,000 new ordinary stock. The minimum prices and yields are respectively £79 per £100, yielding £5 1s. 3d. p.ct.; £94 per £100, yielding £5 6s 5d. p.ct.; and £102 per £100, yielding £6 7s. p.ct. The new capital will be utilized in repaying mortgages and part of a loan obtained for extension of the works, plant, mains, &c., necessary to enable the constantly increasing demands for gas to be met. Tenders for the various stocks must be forwarded to the firm at No. 37, Walbrook, E.C., not later than 11 o'clock on Thursday, Nov. 20. [The issue is advertised in our advertisement columns this week.]

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(See Article in "JOURNAL," May 21, p. 523.)

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Tins for Sale to Consumers.
In Bulk for Works Use.
(See p. 204 "Gas Salesman," Oct. 22.)

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THE BRITISH GAS PURIFYING MATERIALS CO., LTD., 99, LONDON ROAD, LEICESTER.

Solicit enquiries for:—
NATURAL BRITISH PURIFYING MATERIAL,
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BEST QUALITY DUTCH BOG ORE,
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"PREPARED" AND "UNPREPARED"
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A NATURAL HYDRATED BRITISH OXIDE
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READY FOR IMMEDIATE USE.

THE
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COMPETITIVE PRICES FOR OTHER AREAS.

Particulars and Price Delivered, from the Sole Selling Agent:

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FOR Motor Lorries and Railway Traffic can be seen erected at our works READY FOR DELIVERY. Inspection by your Engineer invited, and a test by your Local Inspector of Weights and Measures before delivery. Every machine a High-Class Engineering Product and fully guaranteed.
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SULPHATE OF AMMONIA SATURATORS and all LEAD and TIMBER WORK in connection with Sulphate Plants.
We Guarantee promptness with efficiency for Repairs.
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SPENCER'S Patent Inclined HURDLE GRIDS.

THE very best Patent Grids for Holding Oxide Lightly.
See Illustrated Advertisement, Oct. 8, p. 120.

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SPECIALLY prepared for the manu- facture of SULPHATE OF AMMONIA.
SPENCER CHAPMAN & MESSEL, LTD.,
with which is amalgamated WM. PEARCE & SONS, LTD., 36, Mark Lane, LONDON, E.C. Works—SILVERTOWN.
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GEORGE WILSON GAS METERS, Ltd. for
GAS-METERS, ORDINARIES, SLOTS, AND REPAIRS.
Foleshill Road, COVENTRY.
Telephone: 596. Telegrams: "GASMETER,"
and at 268, Stockport Road, MANCHESTER.
Telephone: RUSHOLME 976. Telegrams: "GASMETER,"
and 46 & 47, Auckland Street, LONDON, S.E. 11.
Telephone: HOP 647. Telegrams: "GASEOUS LAMB."

MEWBURN, ELLIS, & CO.,
CHARTERED PATENT AGENTS AND TRADE MARK AGENTS,
70 & 72, Chancery Lane, London, W.C. 2.
Telegrams: "Patent, London." Phone 248 Holborn.
And 3, St. Nicholas Buildings, Newcastle-on-Tyne.

PATENTS and Trademarks. Inventors' Advice, Handbook and Cons. free. B. T. KING (Regd. Patent Agent, G.B., Canada and U.S.A.), 146A, QUEEN VICTORIA STREET, LONDON. 38 years' refs. 'Phone 682 Cent.

HUTCHINSON BROTHERS, Ltd.,
FALCON WORKS, BARNSLEY.

MANUFACTURERS OF
GAS METERS (Ordinary and Slot).

"FALCON" INVERTED LAMPS,
SQUARE STREET LANTERNS'
SUPERHEATER BURNERS, and
CONVERSION SETS for Street Lanterns.

SULPHURIC ACID.

JOHN RILEY & SONS, Limited, Chemi- cal Manufacturers, Hapton, near Burnley, are MAKERS of Special SULPHURIC ACID ("Eagle" Brand), for Sulphate of Ammonia Making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol, which has now been used for upwards of 60 years. Reference given to Gas Companies.

J. E. C. LORD (Manchester), Ltd., Ship Canal Tar Works, Weaste, Manchester. Pitch, Creosote, Benzols, Toluol, Naphtha, Pyridine, all kinds of Cresylic Acid, Carbolic Acid, &c.

APPOINTMENTS, &c., VACANT.

WHEN Filling Vacancies, please REMEMBER THE CLAIM OF THE EX-SERVICE MAN, who, other Qualifications being equal, has the FIRST CALL ON YOUR CONSIDERATION.

NO. 7473.

ALL Applicants for Position Adver- tised under No. 7473 are THANKED for their Applications, and Advised that APPOINTMENT IS NOW COMPLETED.

MIDDLESEX EDUCATION COMMITTEE.

ACTON AND CHISWICK POLYTECHNIC.

LECTURER in Gas Supply Practice required *immediately*, Monday and Tuesday evenings, 7.30-9.30. Forms of Application, which must be returned by Monday, the 10th November, to be obtained from the PRINCIPAL, THE POLYTECHNIC, BATH ROAD, CHISWICK, W. 4.

OSWALDTWISTLE URBAN DISTRICT COUNCIL.
(GAS DEPARTMENT.)

APPLICATIONS are invited for the Appointment of ENGINEER and MANAGER of the Gas-Works belonging to the above Council. Commencing salary, £450 per Annum.
Candidates must be practical Engineers and Draughtsmen and able to Manage and Control the Staffs and Workmen in the Department.
Applications, endorsed "Gas," stating Age, Experience, full Particulars of Practical and Technical Training, and *copies* of Three Recent Testimonials, to be sent to the undersigned on or before Tuesday, the 11th day of November, 1924.

J. W. BOOTH,
Clerk to the Council.

Town Hall,
Oswaldtwistle,
Lancashire,
Oct. 25, 1924.

GAS Company in a Home County requires the services of a capable ENGINEER to take charge of Gas-Works and Distribution. Annual output about 40 millions. Write, stating Age, Experience, and Salary required (Testimonials not required in first instance), and date when able to begin, to Box 638, care of JUDDS, 81, Gresham Street, E.C.
Applications to be in by Nov. 15, 1924.

COUNTY BOROUGH OF PRESTON.

GAS EXAMINER, INSPECTOR OF METERS, &c.

THE Corporation invite Applications for the Position of GAS EXAMINER, INSPECTOR OF METERS, and LIGHTING SUPERINTENDENT. The person appointed must be competent to Test the Quality of Gas in accordance with the requirements of the Gas Referees, and must possess the Certificate of the Board of Trade as to his Qualifications for Testing Meters.
Salary £150 per Annum, *plus* Civil Service Bonus, which at present amounts to £88 15s. 5d.
The person appointed will be required to contribute to the Superannuation Scheme, and to pass a Medical Examination.
Forms of Application are obtainable from the undersigned, to whom applications, accompanied by *copies* of not more than Three Testimonials (which will not be returned), endorsed "Gas Examiner, &c.," should be Delivered not later than the 10th of November, 1924.
Canvassing will disqualify.

ALFRED HOWARTH,
Town Clerk.

Town Hall,
Preston,
Oct. 31, 1924.

BURNLEY CORPORATION.
(GAS DEPARTMENT.)

APPLICATIONS are invited for the undermentioned POSITIONS in the above Department:—
(1)—TEMPORARY ASSISTANT DRAUGHTSMAN. Candidates must have obtained previous experience of Draughtsmanship in a Gas Undertaking. Salary, about £4 a Week, according to Experience.
(2)—FIRST-CLASS DRAUGHTSMAN having previous Experience in the preparation of Plans in Connection with the erection of new Works. Candidates must be Experienced in Constructional Work and in the Design of Gas-Works Plant. This appointment, subject to satisfactory service, will be for a period of from Two to Three Years, and the Salary payable will be about £6 a Week, according to Experience.
Applications, which must be on the Form obtainable from the undersigned, must reach this Office on or before Wednesday, the 12th of November next, endorsed in the appropriate manner.

COLIN CAMPBELL,
Town Clerk.

Town Clerk's Office,
Burnley,
Oct. 28, 1924.

BURGH OF JOHNSTONE.

GAS Manager wanted, Starting Salary £400 per Annum.
Applications, with Twelve *copies* of the Four most recent Testimonials to be lodged with the undersigned not later than the 15th of November, 1924.

A. ALSTON CAMERON,
Town Clerk.

WANTED—Two Experienced Gas FITTERS, accustomed to Fixing Gas Fires, Meters, Cookers, and Carcassing Houses with Lead Pipe. Wages 1s. 2¾d. per hour, *plus* 12½ p.ct. bonus = 1s. 4¾d. per hour.
Applications, stating Age and Experience, to be addressed to ENGINEER & MANAGER, CORPORATION GAS DEPARTMENT, STAFFORD.

TEMPORARY Gas-Fitters Wanted, must be Experienced Men, used to Meters, Fires and Gas Apparatus generally.
Apply to the GAS OFFICES, LEICESTER.

MECHANIC — First-Class leading FITTER wanted, with sound practical Experience in the Construction, Repair, and Maintenance of Gas Works Plant and Machinery. Good Salary and Conditions.
Apply, in *First Instance*, to No. 7483, "GAS JOURNAL," 11, BOLT COURT, FLEET STREET, E.C. 4.

WANTED — First-Class Travelling Representative, with good connection amongst Gas and Commercial Manufacturers, for Engineering Works in Glasgow district.
State Experience, Qualifications, and Salary required, and give Reference.
Apply, by letter, to Messrs. MANN, JUDD, GORDON, & Co., 142, ST. VINCENT STREET, GLASGOW.

DARWEN CORPORATION.
(GAS DEPARTMENT.)

WANTED—Practical and fully quali- fied DISTRIBUTION FOREMAN. Applicants must be Good Organizers, capable in the Control of Men. Experienced in Main and Service Laying, acquainted with the Fixing, Working, and Maintenance of all Modern Gas Appliances, and High Pressure Gas Lighting, and able competently to advise Consumers.
Applications, enclosing Three Recent Testimonials and stating Age and Salary required, to A. H. Smith, Gas Engineer, Gas-Works, Darwen, on or before the 12th of November, endorsed "Distribution Foreman."

H. ROTHWELL,
Town Clerk.

Town Clerk's Office,
Darwen.

APPOINTMENTS, &c., WANTED.

EXPERIENCED Lecturer and Demon- STRATOR in Cooking by Gas can give Local Demonstrations for Gas Undertakings.
Gas Engineers should apply now for vacant dates to Miss H. I. TUXFORD, M.C.A., "SOUTHBOURNE," BOTTESFORD, NOTTS.

PLANT, &c., FOR SALE & WANTED.

GAS PLANT IN STOCK.

EXHAUSTERS. — Steam and Belt Driven, 4000 to 50,000 c.ft. capacity.
Purifiers.—Sets of 25 ft., 16 ft. by 12 ft., 10 ft. sq., and 10 ft. by 8 ft. Also Single Boxes 10 ft. sq.
Condensers.—Vertical C.I. Water Tube (½ million per day), 14 in. Connections. Also 6 in. and 8 in. Pipe Condensers.
Tower Scrubbers.—4½ by 36. 4½ by 18, 4 by 12.
Station Meters and Governors.—6 in. and 8 in. Connections, several nearly new.
Gasholder and Steel Tank.—10,000 capacity, with Cup for another Lift.
Tar Extractor.—Everett's Patent, 14 in. Connections.
Also in stock PUMPS, TANKS, VALVES, &c.
Bargain prices for erection complete.
Send us your inquiries.
Firth Blakeley, Sons, & Co., Ltd.,
CHURCH-FENTON, via LEEDS.